REPAIR PARTS CATALOG
FOR
SUNNEN® CNC VERTICAL HONING MACHINE

MODEL:

SV2560

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SUNNEN® PRODUCTS COMPANY
7910 MANCHESTER ROAD • ST. LOUIS, MO 63143, U.S.A. • PHONE: 314-781-2100

X-SV-5605

Like any machinery, this equipment may be dangerous if used improperly. Be sure to read and follow instructions for operation of equipment.

INTRODUCTION

Illustrations show all major components in exploded detail. Item numbers on each illustration are keyed to the corresponding parts list, providing a descriptive identification of each part.

The parts lists include assemblies as well as detail parts. An item listed without a part number can be obtained as a component of the complete assembly of which it is a part.

Standard hardware items are listed with complete descriptions, such as Item 29 below. **These may be purchased at your local hardware store,** but it is important to replace an item with one having the same dimensions as the original. In some places brand names and part numbers are shown. These may change depending upon availability.

Sunnen Products Company reserves the right to make changes, without notice, to materials, specifications, colors, designs and accessories included with units.

HOW TO ORDER

When ordering replacement parts be sure to include the following information to ensure prompt shipment of correct parts:

1. The part number and description of each part desired, obtained from this parts catalog.

2. The quantity of each part desired.

3. The voltage, frequency and phase, when ordering electrical parts.

4. The model and serial number of the machine, obtained from the name plate, where there is any question concerning a part.

HOW TO USE THIS PARTS LIST

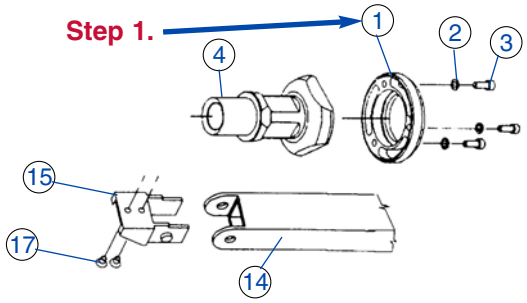
Step 1. – Locate desired part on illustration. Note item number.

Step 2. – Locate item number in the parts list.

Step 3. – If the item has a part number listed, order by part number and the description. A part number in light face type indicates that it is a component of the last preceding part number in bold face type.

Step 4. – If no number is listed, order the part number of the unit of which the desired part is a component. **ORDER ONLY BY PART NUMBER AND DESCRIPTION – NOT** by item number.

NOTE: In this manual, parts may be followed by "(For CE Machines)" or "(For Non-CE Machines)" to denote domestic machines from exported machines. The CE version is constructed to meet the requirements of the European market, and is available to any customer.



ITEM NO.	ORDER BY PART NUMBER	QTY.	DESCRIPTION
1	**MVH-4499A**	**1**	**....Spindle Cap** *includes*
2	PHSM-405	3	.....Screw (M6 x 1 x 16 SHCS)
3	PHW-354	3	.....Washer (M6)
4	**MVH-4422**	**1**	**....Inner Spindle Nose**
14	**PEM-870A**	**1**	**....Cable Carrier** *includes*
15	PEM-871	1	.....Cable Carrier Bracket
16	PEM-872	1	.....Cable Carrier Bracket
17	**PHSM-600**	**1**	**....Screw** (M3 x 0,5 x 5mm FHCS)

Step 2. → Item 1
Step 3. → Item 2
Step 4. → Items 15, 16

GENERAL INFORMATION

The Sunnen® equipment has been designed and engineered for a wide variety of parts within the capacity and limitation of the equipment. With proper care and maintenance this equipment will give years of service.

READ THE FOLLOWING INSTRUCTIONS CAREFULLY AND THOROUGHLY BEFORE UNPACKING, INSPECTING, OR INSTALLING THIS EQUIPMENT.

IMPORTANT: Read any supplemental instructions BEFORE installing this equipment. These supplemental instructions give you important information to assist you with the planning and installation of your Sunnen equipment.

Sunnen Technical Service Department is available to provide telephone assistance for installation, programming, & troubleshooting of your Sunnen equipment. All support is available during normal business hours, 8:00 AM to 4:30 PM Central Time. Emergency breakdown support is available on a 24 hour / 7 day basis.

Review all literature provided with your Sunnen equipment. This literature provides valuable information for proper installation, operation, and maintenance of your equipment. Troubleshooting information can also be found within the Instructions. If you cannot find what you need, call for technical support.

Where applicable, programming information for your Sunnen equipment is also included. Most answers can be found in the literature packaged with your equipment.

Help us help you. When ordering parts, requesting information, or technical assistance about your equipment, please have the following information available:

- Have ALL MANUALS on hand. The Customer Services Representative or Technician will refer to it.
- Have Model Number and Serial Number printed on your equipment Specification Nameplate.
- Where Applicable: Have Drive model and all nameplate data. Motor type, brand, and all nameplate data.

For Troubleshooting, additional information may be required:

- Power distribution information (type - delta, wye, power factor correction; other major switching devices used, voltage fluctuations)
- Installation Wiring (separation of power & control wire; wire type/class used, distance between drive and motor, grounding).
- Use of any optional devices/equipment between the Drive & motor (output chokes, etc.).

For fast service on your orders call:

Sunnen Automotive Customer Service toll free at: 1-800-772-2878

Sunnen Industrial Customer Service toll free at: 1-800-325-3670

Customers outside the USA, contact your local authorized Sunnen Distributor.

Additional information available at: http://www.sunnen.com or e-mail: sunnen@sunnen.com

NOTE: Sunnen reserves the right to change or revise specifications and product design in connection with any feature of our products contained herein. Such changes do not entitle the buyer to corresponding changes, improvements, additions, or replacements for equipment, supplies or accessories previously sold. Information contained herein is considered to be accurate based on available information at the time of printing. Should any discrepancy of information arise, Sunnen recommends that user verify the discrepancy with Sunnen before proceeding.

ESD PREVENTION REVIEW

Let's review the basics of a sound static control system and its effective implementation. First, in the three step plan:

1. Always ground yourself when handling sensitive components or assemblies.
2. Always use a conductive or shielded container during storage or transportation. These materials create a Faraday cage which will isolate the contents from static charges.
3. Open ESD safe containers only at a static safe work station.

At the static safe work station, follow these procedures before beginning any work:

A. Put on your wrist strap or foot grounding devices.

B. Check all grounding cords to make sure they are properly connected to ground, ensuring the effective dissipation of static charges.

C. Make sure that your work surface is clean and clear of unnecessary materials, particularly common plastics.

D. Anti-static bubble wrap has been included for use at the machine when an ESD safe workstation is not available.

You are now properly grounded and ready to begin work. Following these few simple rules and using a little common sense will go a long way toward helping you and your company in the battle against the hazards of static electricity. When you are working with ESD sensitive devices, make sure you:

GROUND

ISOLATE

NEUTRALIZE

SUNNEN® LIMITED PRODUCT WARRANTY

Sunnen® Products Company and its subsidiaries (SPC) warrant that all new SPC honing machines, gaging equipment, tooling, and related equipment will be free of defects in material and/or workmanship for a period of one year from the date of original shipment from SPC.

Upon prompt notification of a defect during the one-year period, SPC will repair, replace, or refund the purchase price, with respect to parts that prove to be defective (as defined above). Any equipment or tooling which is found to be defective from improper use will be returned at the customer's cost or repaired (if possible) at customer's request. Customer shall be charged current rates for all such repair.

Prior to returning any SPC product, an authorization (RMA#) and shipping instructions must be obtained from the Customer Service Department or items sent to SPC will be returned to the customer.

Warranty Limitations and Exclusions This Warranty does not apply to the following:

- Normal maintenance items subject to wear and tear: (belts, fuses, filters, etc).
- Damages resulting from but not limited to:
  - › Shipment to the customer (for items delivered to customer or customer's agent F.O.B., Shipping Point)
  - › Incorrect installation including improper lifting, dropping and/or placement
  - › Incorrect electric power (beyond +/- 10% of rated voltage) including intermittent or random voltage spikes or drops
  - › Incorrect air supply volume and/or pressure and/or contaminated air supply
  - › Electromagnetic or radio frequency interference from surrounding equipment (EMI, RFI)
  - › Storm, lightning, flood or fire damage
  - › Failure to perform regular maintenance as outlined in SPC manuals
  - › Improper machine setup or operation causing a crash to occur
  - › Misapplication of the equipment
  - › Use of non-SPC machines, tooling, abrasive, fixturing, coolant, repair parts, or filtration
  - › Incorrect software installation and/or misuse
  - › Non-authorized customer installed electronics and/or software
  - › Customer modifications to SPC software

THE LIMITED WARRANTY DESCRIBED HEREIN IS EXPRESSLY IN LIEU OF ALL ANY OTHER WARRANTIES. SPC MAKES NO REPRESENTATION OR WARRANTY OF ANY OTHER KIND, EXPRESS OR IMPLIED, WHETHER AS TO MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR ANY OTHER MATTER. SPC IS NOT RESPONSIBLE FOR THE IMPROPER USE OF ANY OF ITS PRODUCTS. SPC SHALL NOT BE LIABLE FOR DIRECT, INDIRECT, INCIDENTAL, OR CONSEQUENTIAL DAMAGES INCLUDING BUT NOT LIMITED TO: LOSS OF USE, REVENUE, OR PROFIT. SPC ASSUMES NO LIABILITY FOR PURCHASED ITEMS PRODUCED BY OTHER MANUFACTURERS WHO EXTEND SEPARATE WARRANTIES. REGARDLESS OF ANY RIGHTS AFFORDED BY LAW TO BUYER, SPC's LIABILITY, IF ANY, FOR ANY AND ALL CLAIMS FOR LOSS OR DAMAGES WITH RESPECT TO THE PRODUCTS, AND BUYER'S SOLE AND EXCLUSIVE REMEDY THEREFORE, SHALL IN ALL EVENTS BE LIMITED IN AMOUNT TO THE PURCHASE PRICE OF THAT PORTION OF THE PRODUCTS WITH RESPECT TO WHICH A VALID CLAIM IS MADE.

Shipping Damages

Except in the case of F.O.B., Buyer's destination shipments, SPC will not be liable for any settlement claims for obvious and/or concealed shipping damages. The customer bears the responsibility to unpack all shipments immediately and inspect for damage. When obvious and/or concealed damage is found, the customer must immediately notify the carrier's agent to make an inspection and file a claim. The customer should retain the shipping container and packing material.

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Any alteration or reverse engineering of the software is expressly forbidden and is in violation of this agreement.

SPC reserves the right to update the software covered by this agreement at any time without prior notice and any such updates are covered by this agreement.

GENERAL SAFETY INSTRUCTIONS

READ FIRST

This machine, like any equipment, may be dangerous if used improperly. Please read all warnings and instructions before attempting to use this machine.

Always disconnect power at main enclosure before servicing machine.[1]

Always wear eye protection when operating this machine.

NEVER open or remove any machine cover or protective guard with power "ON." Always disconnect power at main enclosure before servicing this equipment.[1]

DO NOT attempt any repair or maintenance procedure beyond those described in this book. Contact your Sunnen® Field Service Engineer or Technical Services Representative for repairs not covered in these instructions.

Due to the wide variety of machine configurations, all possibilities cannot be described in these instructions. Instructions for safe use and maintenance of optional equipment ordered through Sunnen, will be provided through separate documentation and/or training provided by your Sunnen Field Service Engineer or Technical Services Representative.

DO NOT attempt to defeat any safety device on this machine or on any of the optional equipment.

[1] WARNING: DO NOT touch electrical components until main input power has been turned off and *CHARGE* lamps are extinguished. The capacitors are still charged and can be quite dangerous.

IMPORTANT NOTE

The temperature requirements of the Sunnen® SV-2560 CNC Vertical Honing Machine have been established as 35 degrees C (95 degrees F). Above this temperature, an optional cooler will be available to handle temperatures from 35º to 46º C (95º to 115º F). IT IS NOT recommended that the SV Machine be operated at temperatures above 46º C (115º F). Sunnen Products Company warrants the SV Machine for operating environments up to 35ºC (95º F). For operating environments of 35º to 46º C (95º to 115º F) the warranty only applies if the optional cooler is installed on the Machine. No warranty coverage is offered for operating environments above 46º C (115º F).

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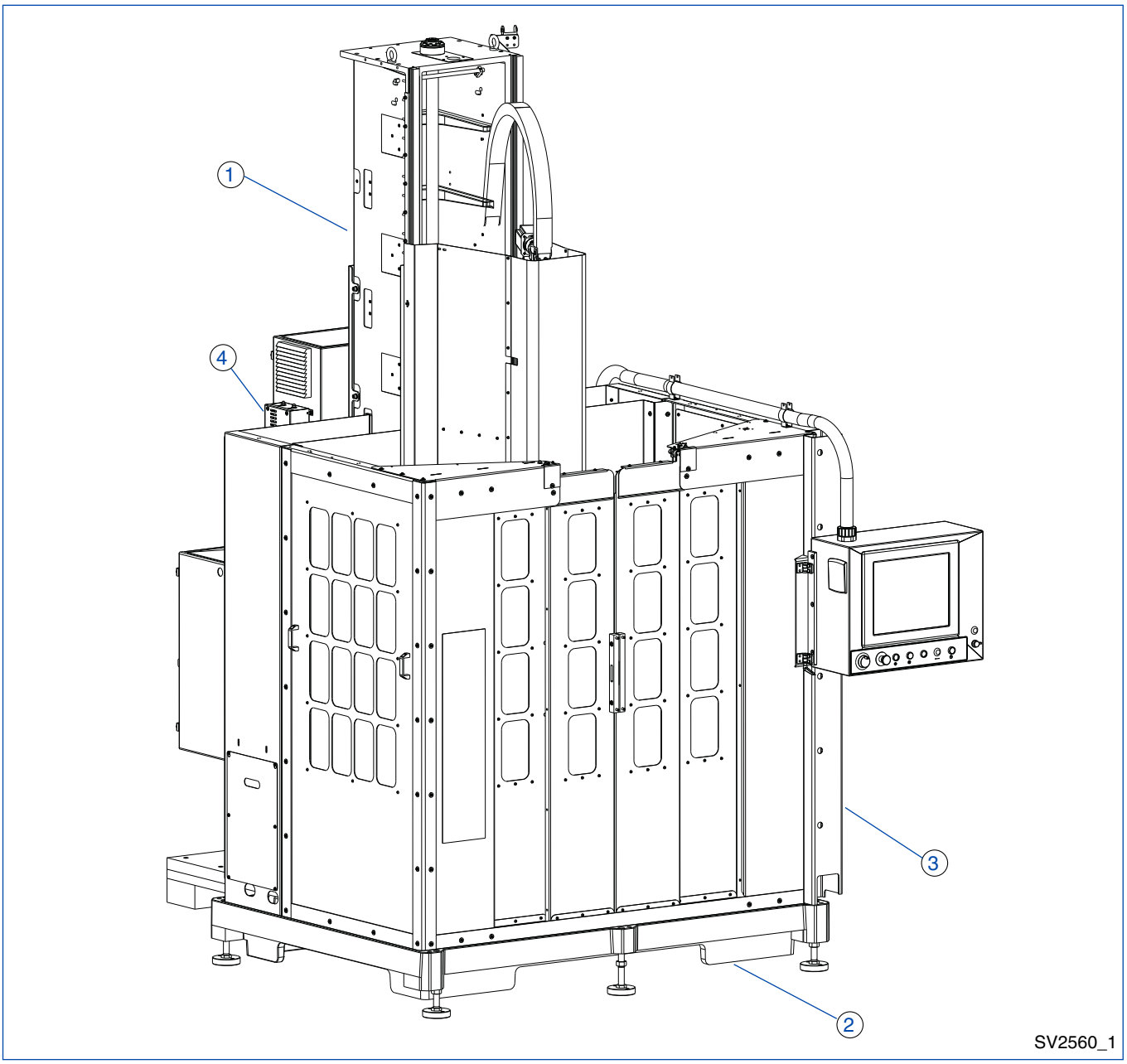

FIGURE 1-A – CNC VERTICAL HONING MACHINE (1 OF 5)

PARTS LIST COVERING FIGURE "1-A"

ITEM NO.	**ORDER BY PART NUMBER**	QTY.	DESCRIPTION
-	**SV2560**	**Ref**	**....CNC Vertical Honing Machine** (1 of 5) *includes*
1	**- - -**	1	.....Column & Riser *(see Figure 1-A, 3 of 5)*
2	**- - -**	1	.....Base *(see Figure 1-A, 4 of 5)*
3	**- - -**	1	.....Guard Sets *(see Figure 1-A, 4 of 5)*
4	**- - -**	1	.....Guard, Rear *(see Figure 1-A, 5 of 5)*

N/S indicates Not Shown

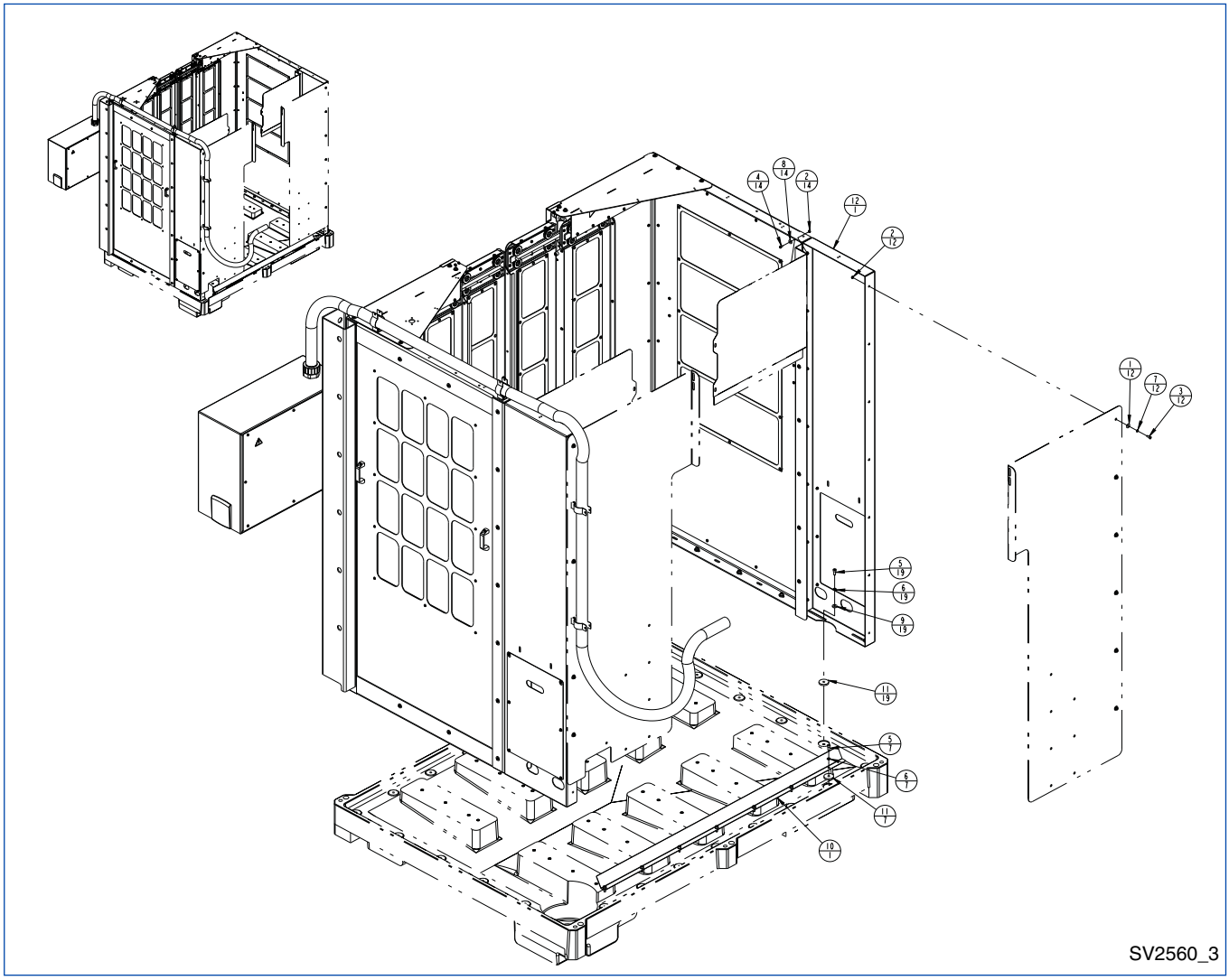

FIGURE 1-A – CNC VERTICAL HONING MACHINE (2 OF 5)

PARTS LIST COVERING FIGURE "1-A"

ITEM NO.	**ORDER BY PART NUMBER**	QTY.	DESCRIPTION
-	**SV2560-3**	**-**	**....CNC Vertical Honing Machine** (2 of 5) *includes*
1	AN13B	12	.....Flatwasher (.257 ID x .750 OD x .065)
2	PHNM436	26	.....Nut, Self Clinching (M6 x 1,0)
3	PHSM405	12	.....Screw (M6 x 1,0 x 16mm SHCS)
4	PHSM749	14	.....Screw (M6 x 1,0 x 12mm BSHCS)
5	PHSM965	26	.....Screw (M8 x 1,25 x 20mm SHCS)
6	PHWM407	26	.....Lockwasher (M8)
7	PHWM509	12	.....Lockwasher (M6)
8	PHWM530	14	.....Washer, Fender (M6)
9	PHWM532	19	.....Flatwasher (M8)
10	SV24286	1	.....Drip Edge
11	SV54023	26	.....Washer
12	SV54430	1	.....Guard Set Assembly *(see Figure 1-C)*

N/S indicates Not Shown

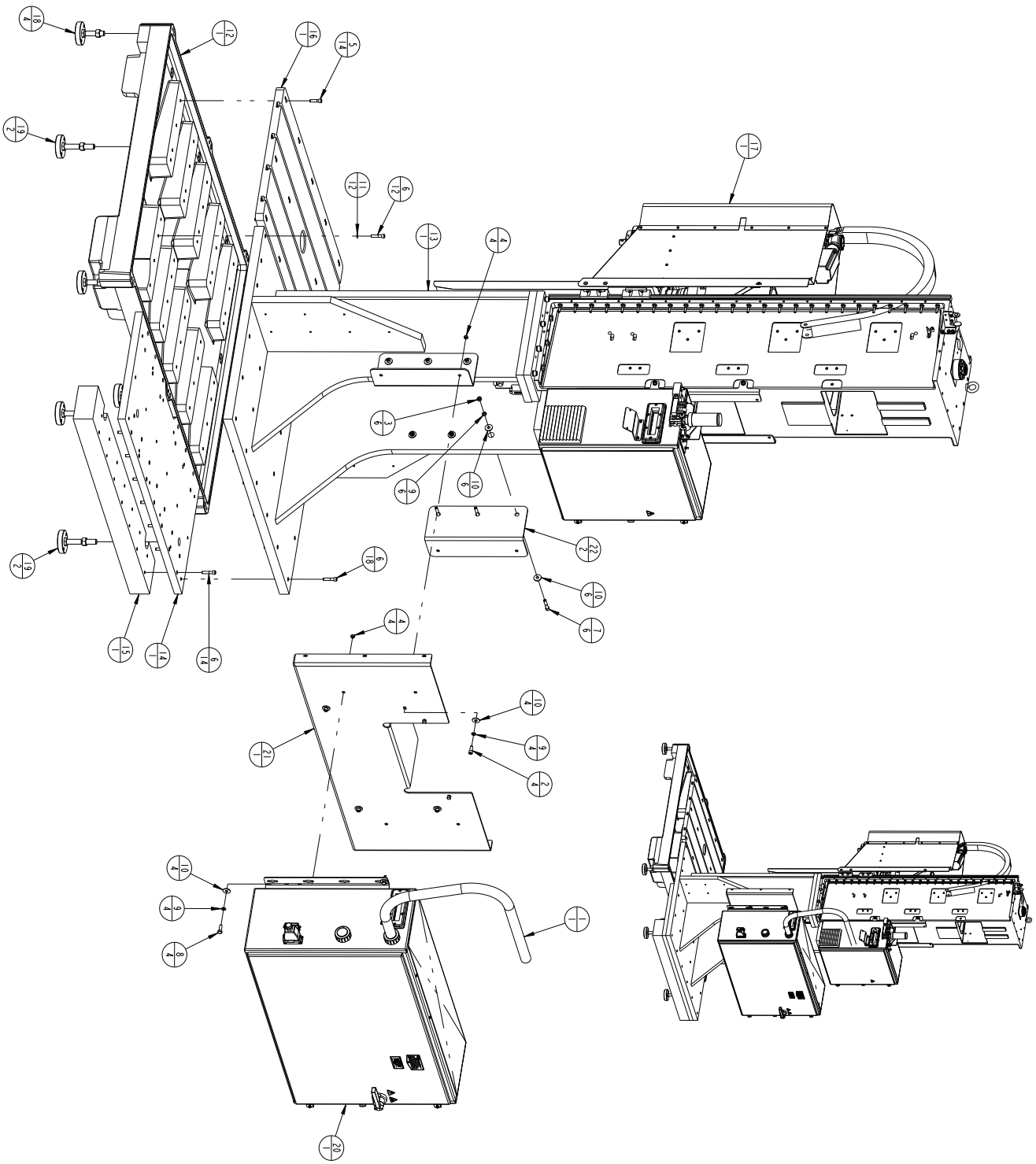

FIGURE 1-A – CNC VERTICAL HONING MACHINE (3 OF 5)

PARTS LIST COVERING FIGURE "1-A"

ITEM NO.	**ORDER BY PART NUMBER**	QTY.	DESCRIPTION
-	**SV2560-1**	**-**	**....CNC Vertical Honing Machine** (3 of 5) *includes*
1	86114SV460	1	.....Cable
2	HL639	4	.....Screw (M12 x 1,75 x 30mm SHCS)
3	PHNM406	6	.....Nut, Hex (M12 x 1,75)
4	PHNM494	8	.....Nut, Self Clinching (M12 x 1,75)
5	PHSM453	14	.....Screw (M12 x 1,75 x 45mm SHCS)
6	PHSM454	44	.....Screw (M12 x 1,75 x 55mm SHCS)
7	PHSM480	6	.....Screw (M12 x 1,75 x 65mm SHCS)
8	PHSM684	8	.....Screw (M12 x 1,75 x 35mm HHCS)
9	PHWM408	14	.....Lockwasher (M12)
10	PHWM542	20	.....Washer, Fender (M12)
11	PHWM573	12	.....Lockwasher (M12,7)
12	SV51001	1	.....SV310 Base
13	SV51020SV2560	1	.....Riser Weldment, SV360/SV2560
14	SV51061	1	.....Riser Support Plate
15	SV51062	1	.....Riser Foot Plate
16	SV51117	1	.....SV360/SV2560 T-Slot Table
17	SV52605	1	.....Machine Column Module *(see Figure 1-B)*
18	SV53515	4	.....100mm Foot Assembly
19	SV53520	4	.....150mm Foot Assembly
20	SV53940	1	.....Base Electrical Enclosure *(see Figure 1-E)*
21	SV54035SV1052BH	1	.....Electrical Support Weldment For SV500
22	SV54037SV1052BH	2	.....Enclosure Riser Side Support
-	SV26000	1	.....Base Electrical Enclosure *(see Figure 1-E)*

N/S indicates Not Shown

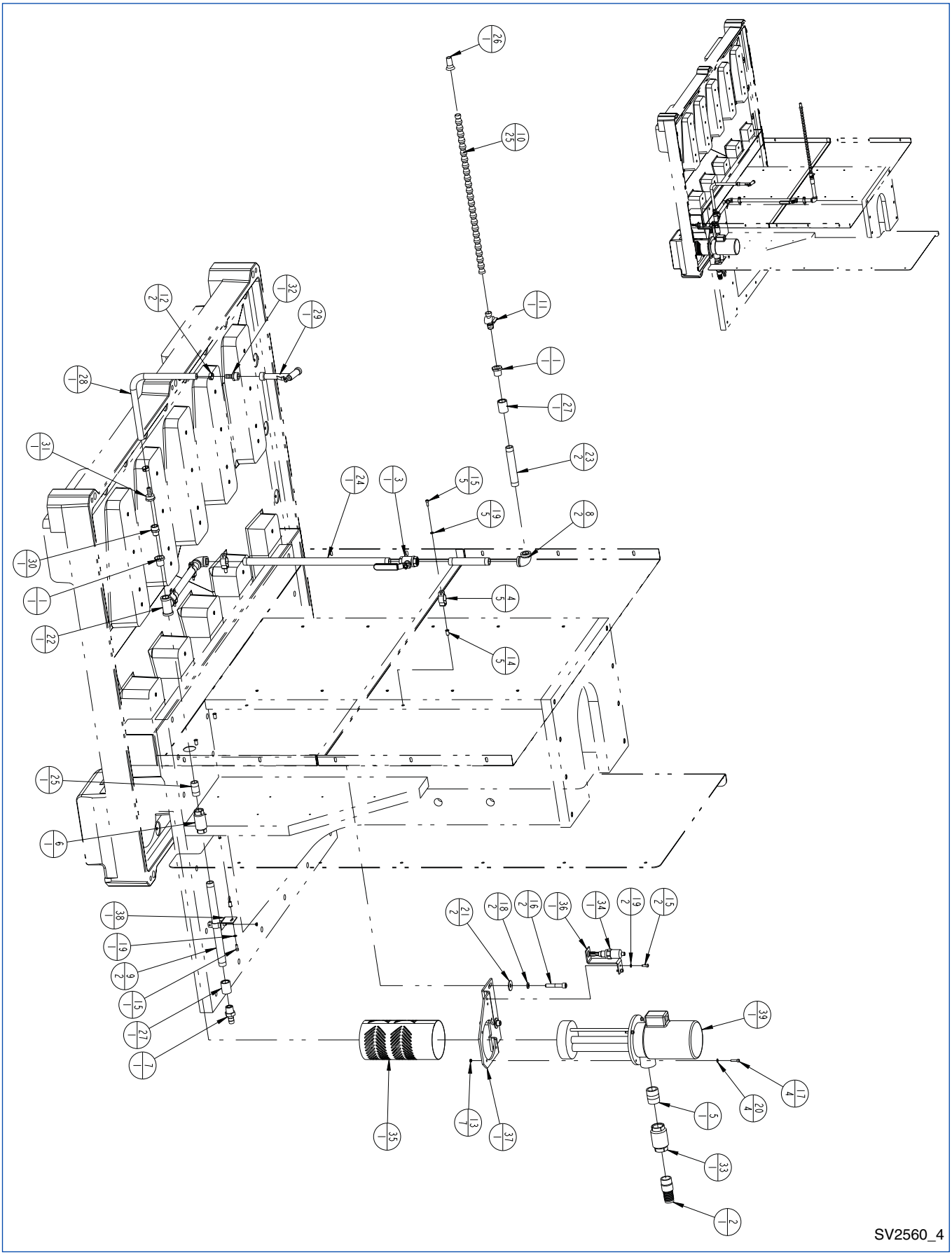

FIGURE 1-A – CNC VERTICAL HONING MACHINE (4 OF 5)

PARTS LIST COVERING FIGURE "1-A"

ITEM NO.	ORDER BY PART NUMBER	QTY.	DESCRIPTION
-	**SV2560-4**	-	**....CNC Vertical Honing Machine** (4 of 5) *includes*
1	CK1328	1	.....Pipe Hex Bushing (3/4" x 1/2)
2	F1420	1	.....Barb Hose
3	F1649	1	.....Valve Ball
4	F2855	5	.....Conduit Hanger
5	F3373	1	.....Nipple (1-1/4 x 2)
6	F4573GH2	1	.....Check Valve (3/4")
7	F46959	1	.....Barb Hose (3/4")
8	MAN1079	2	.....Pipe Elbow (3/4")
9	MB2228SF	2	.....Pipe Nipple (3/4")
10	PHM464	25	.....Flexible Hose Segment
11	PHM520	1	.....Loc-Line Shut Off Valve
12	PHM618	2	.....Hose Clamp
13	PHNM436	7	.....Nut, Self Clinching (M6 x 1,0)
14	PHNM483	5	.....Nut, Knurled (M6 x 10)
15	PHSM405	8	.....Screw (M6 x 1,0 x 16mm SHCS)
16	PHSM480	2	.....Screw (M12 x 1,75 x 65mm SHCS)
17	PHSM966	4	.....Screw (M6 x 1,0 x 25mm SHCS)
18	PHWM408	2	.....Lockwasher (M12)
19	PHWM509	8	.....Lockwasher (M6)
20	PHWM541	4	.....Flatwasher (M6)
21	PHWM542	2	.....Washer, Fender (M12)
22	PPP201	1	.....Pipe Tee (3/4")
23	PPP333	2	.....Pipe Nipple (3/4 x 6")
24	PPP394	1	.....Pipe Nipple (3/4 x 22")
25	PPP396	1	.....Pipe Nipple (3/4 x 2")
26	PPP495	1	.....Nozzle
28	PPP774SV1052BH	1	.....Hose
29	PPP775	1	.....Spray Nozzle
30	PPP776	1	.....Garden Hose Fitting
31	PPP779	1	.....Garden Hose Coupling - Female
32	PPP780	1	.....Garden Hose Coupling - Male
33	PPP784	1	.....Check Valve
34	SV21099	1	.....Level Limit Switch
35	SV21111SV2560	1	.....Pump Screen
36	SV24189	1	.....Level Switch Bracket
37	SV24194	1	.....Pump Mounting Bracket
38	SV24282	1	.....Hanger Bracket
39	SV51298	1	.....Sump Pump

N/S indicates Not Shown

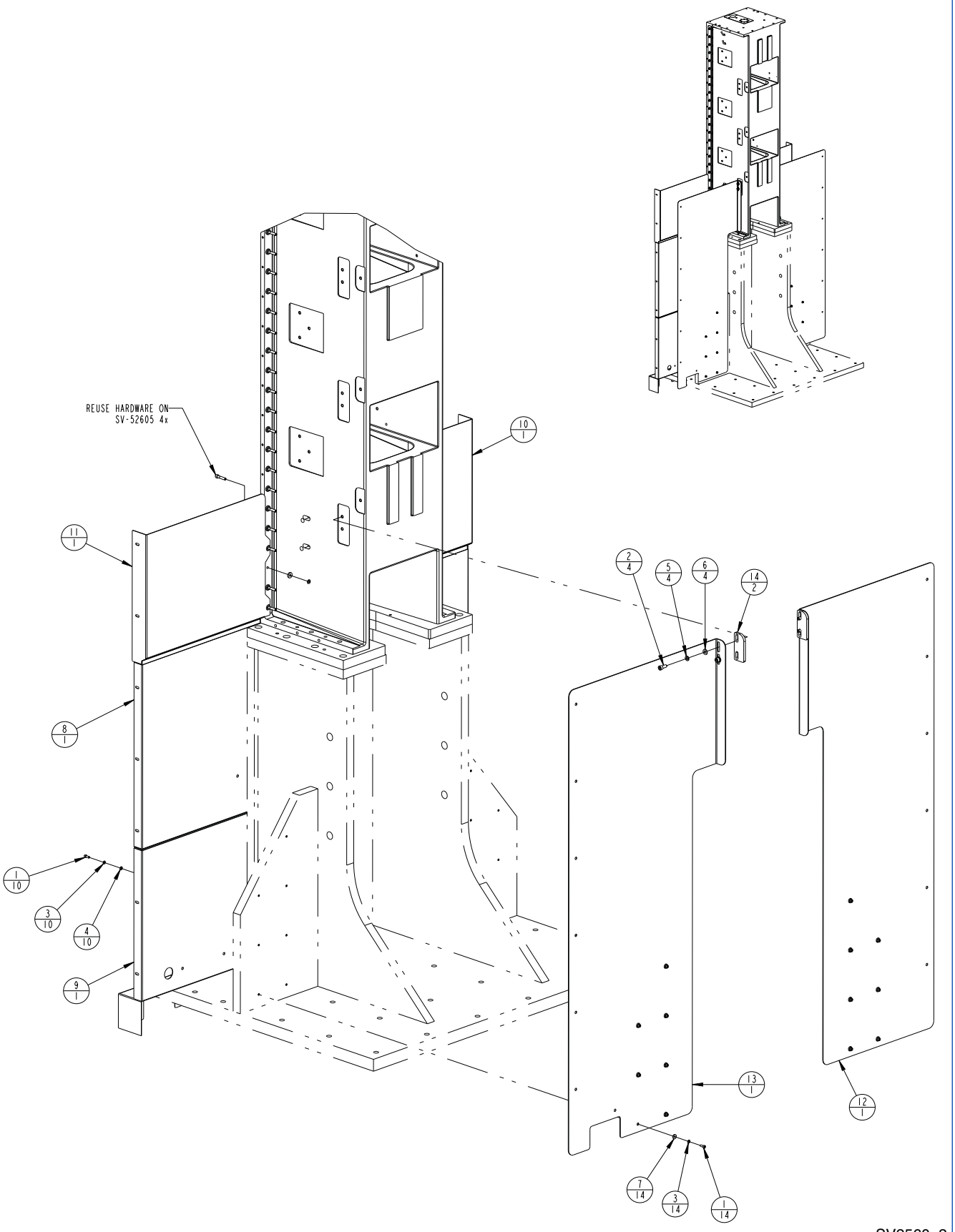

FIGURE 1-A – CNC VERTICAL HONING MACHINE (5 OF 5)

PARTS LIST COVERING FIGURE "1-A"

ITEM NO.	**ORDER BY PART NUMBER**	QTY.	DESCRIPTION
-	**SV2560-2**	**-**	**....CNC Vertical Honing Machine** (5 of 5) *includes*
1	PHSM405	24	.....Screw (M6 x 1,0 x 16mm SHCS)
2	PHSM606	4	.....Screw (M10 x 1,5 x 25mm SHCS)
3	PHWM509	24	.....Lockwasher (M6)
4	PHWM518	10	.....Flatwasher (M6)
5	PHWM521	4	.....Lockwasher (M10)
6	PHWM531	4	.....Flatwasher (M10)
7	PHWM534	14	.....Flatwasher (M6)
8	SV24287	1	.....Base Cover Top
9	SV24288	1	.....Base Cover Bottom
10	SV54014SV2560	1	.....Rear Guarding - Upper Left
11	SV54016SV2560	1	.....Rear Guarding - Upper Right
12	SV54121	1	.....Left Guard (SV2560)
13	SV54122	1	.....Right Guard (SV2560)
14	SV54123	2	.....Guard Spacer

N/S indicates Not Shown

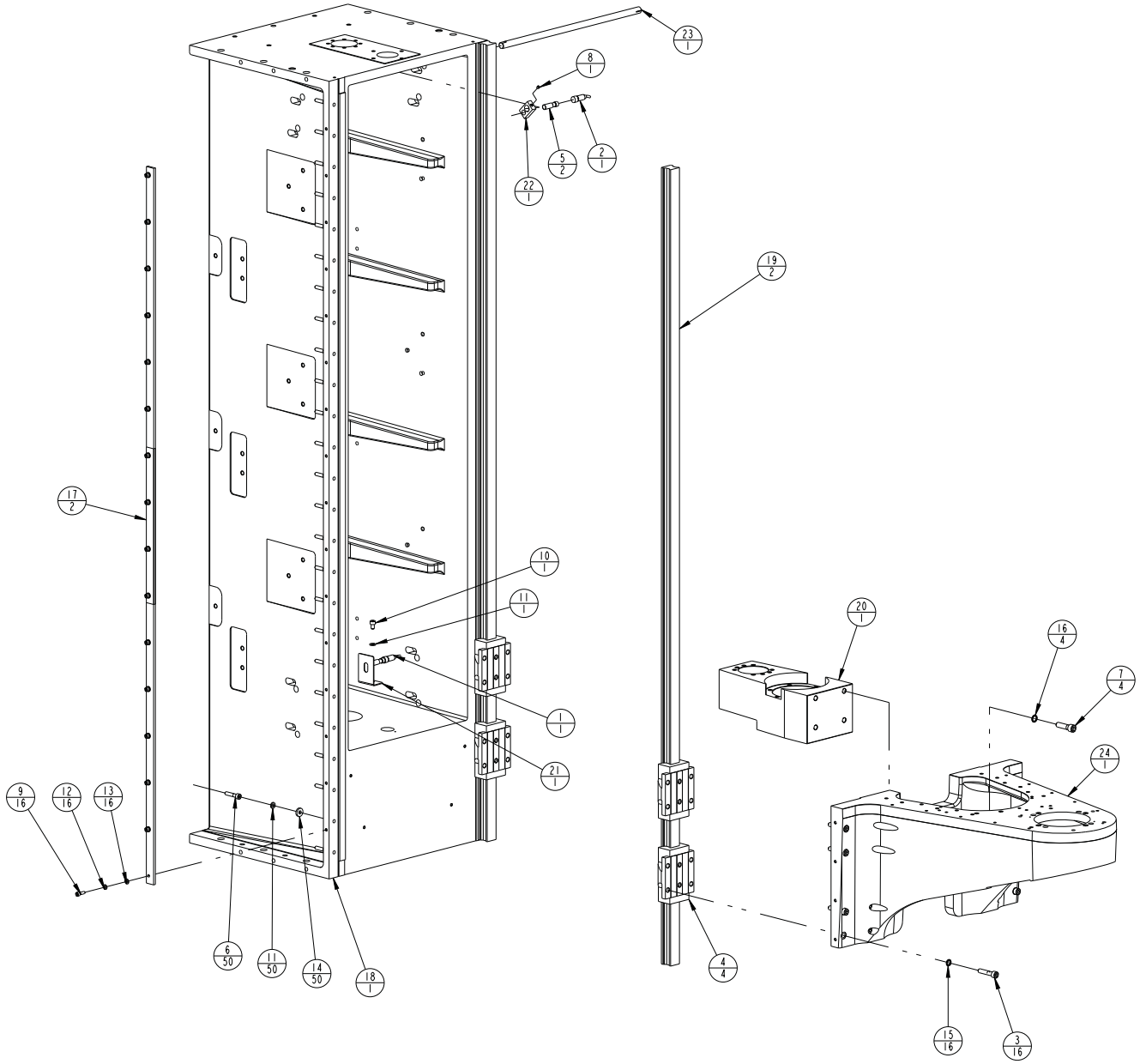

FIGURE 1-B – MACHINE COLUMN ASSEMBLY (1 OF 6)

PARTS LIST COVERING FIGURE "1-B"

ITEM NO.	**ORDER BY PART NUMBER**	QTY.	DESCRIPTION
-	**SV52605op10**	**-**	**....Machine Column Assembly** (2 of 6) *includes*
1	CBL511	1	.....Prox Cable, Lower Limit
2	CBL512	1	.....Prox Cable, Upper Limit
3	F1400	16	.....Screw (M10 x 1,5 x 50mm SHCS)
4	PBR309	4	.....Runner Block
5	PES690	2	.....Proximity Switch PNP NC
6	PHSM444	50	.....Screw (M8 x 1,25 x 40mm SHCS)
7	PHSM453	4	.....Screw (M12 x 1,75 x 45mm SHCS)
8	PHSM466	1	.....Screw (M6 x 1,0 x 6mm CPSHSS)
9	PHSM534	16	.....Screw (M6 x 1,0 x 20mm SHCS)
10	PHSM555	1	.....Screw (M8 x 1,25 x 12mm CPSHSS)
11	PHWM407	51	.....Lockwasher (M8)
12	PHWM509	16	.....Lockwasher (M6)
13	PHWM518	16	.....Flatwasher (M6)
14	PHWM532	50	.....Flatwasher (M8)
15	PHWM572	16	.....Lockwasher (M10)
16	PHWM573	4	.....Lockwasher (M12,7)
17	SV02008	2	.....Column Side Rail Support
18	SV05001	1	.....SV Column AG
19	SV05009	2	.....Column Vertical Guide
20	SV22044	1	.....Ball Nut Carriage
21	SV22063	1	.....Lower Proximity Switch Bracket
22	SV32062	1	.....Upper Proximity Switch Bracket
23	SV52061	2	.....Overtravel Stop Bar
24	SV52301	1	.....SV Carriage Aluminum, Large Column

N/S indicates Not Shown

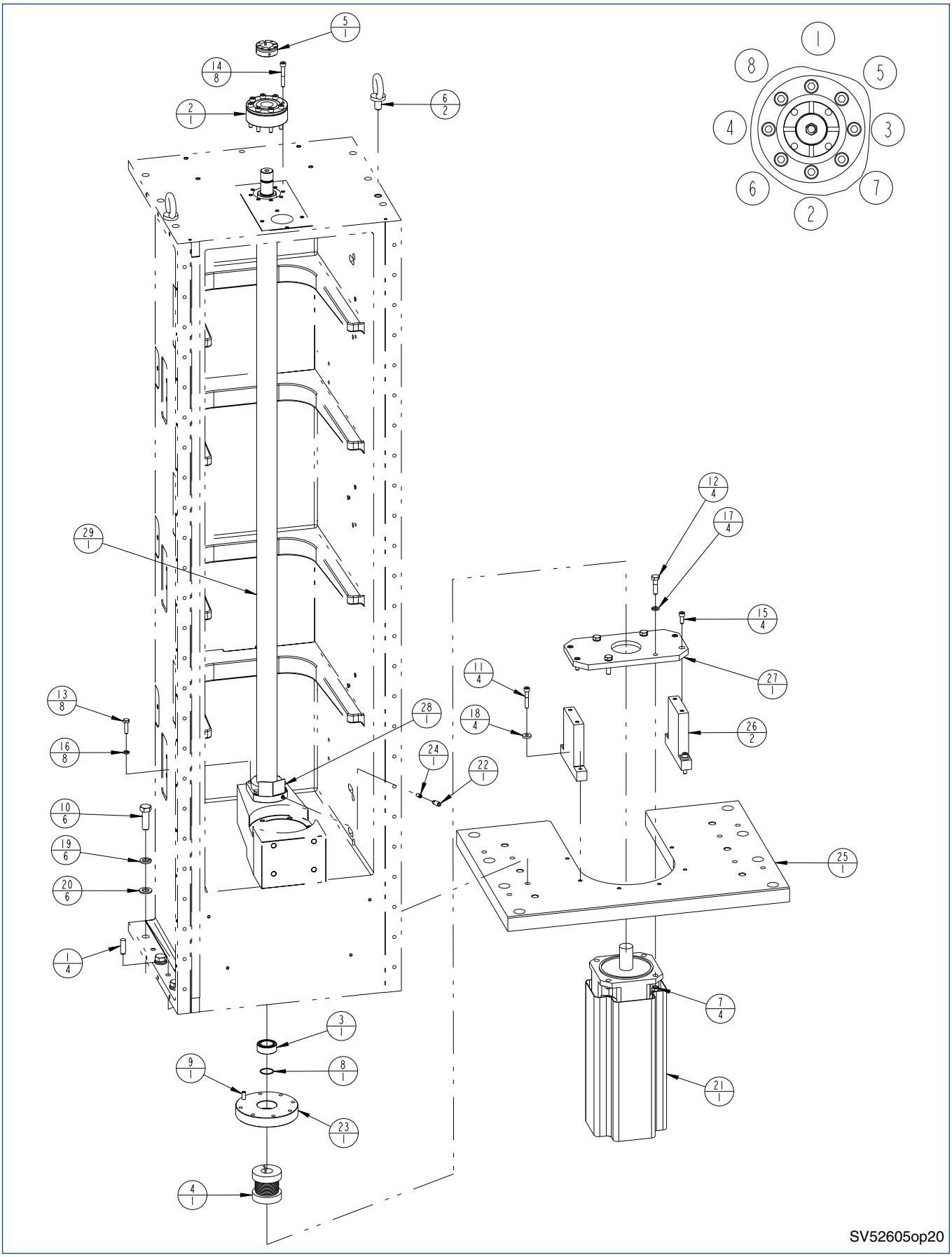

FIGURE 1-B – MACHINE COLUMN ASSEMBLY (2 OF 6)

PARTS LIST COVERING FIGURE "1-B"

ITEM NO.	ORDER BY PART NUMBER	QTY.	DESCRIPTION
-	**SV52605op20**	-	**....Machine Column Assembly** (1 of 6) *includes*
1	F2760	4	.....Dowel Pin
2	PBR310	1	.....Angular Thrust Contact Bearing
3	PBR316	1	.....Needle Roller Bearing
4	PHM568	1	.....Bellows Coupler
5	PHM569	1	.....Precision Locknut
6	PHM581	2	.....Lifting Eye Bolt
7	PHNM421	4	.....Nut, Insert (M10 x 1,8)
8	PHRM321	1	.....Retaining Ring
9	PHSM443	1	.....Screw (M8 x 1,25 x 35mm SHCS)
10	PHSM458SF	6	.....Screw (M16 x 2,0 x 50mm HHCS)
11	PHSM474	4	.....Screw (M8 x 1,25 x 45mm SHCS)
12	PHSM496	4	.....Screw (M10 x 1,5 x 40mm HHCS)
13	PHSM498	8	.....Screw (M8 x 1,25 x 30mm HHCS)
14	PHSM775	8	.....Screw (M8 x 1,25 x 55mm SHCS)
15	PHSM965	4	.....Screw (M8 x 1,25 x 20mm SHCS)
16	PHWM407	8	.....Lockwasher (M8)
17	PHWM521	4	.....Lockwasher (M10)
18	PHWM532	4	.....Flatwasher (M8)
19	PHWM552	6	.....Lockwasher (M16)
20	PHWM554	6	.....Flatwasher (M16)
21	PMO1008	1	.....Blower Cooled Servo Motor
22	PPPM564	1	.....Straight Male Connector
23	SV02011SV2560	1	.....Floating Gearing Support
24	SV02071	1	.....Lube Adapter
25	SV05004	1	.....Support Plate, X-Axis
26	SV05013	2	.....Spacer Block
27	SV32069SV1052BH	1	.....Stroker Motor Base Plate, Special For SV1052BH
28	SV52056	1	.....Grease Deflector
29	SV52070	1	.....Ballscrew Assembly

N/S indicates Not Shown

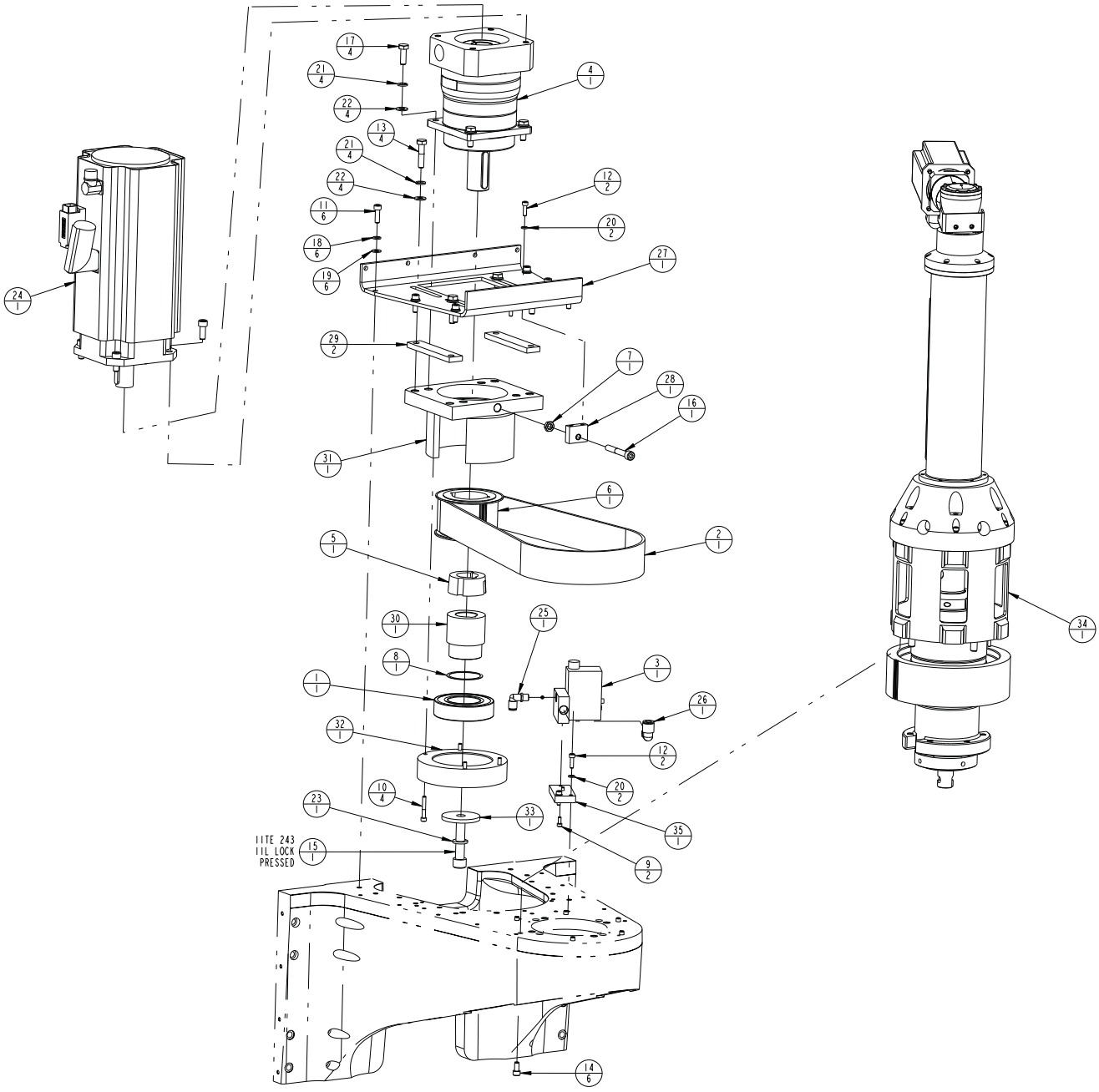

FIGURE 1-B – MACHINE COLUMN ASSEMBLY (3 OF 6)

PARTS LIST COVERING FIGURE "1-B"

ITEM NO.	ORDER BY PART NUMBER	QTY.	DESCRIPTION
-	**SV52605op30**	-	**....Machine Column Assembly** (3 of 6) *includes*
1	PBR355	1	.....Self-Aligning Ball Bearing
2	PDB343	1	.....Timing Belt
3	PED2191	1	.....Remote I/O Electronic I/O Terminal Block
4	PHM623	1	.....Gear Reducer
5	PHM836	1	.....Taper Lock Bushing
6	PHM843	1	.....Poly Chain GT2
7	PHNM408	1	.....Nut, Hex Jam (M10 x 1,5)
8	PHRM316	1	.....Retaining Ring, External
9	PHSM401	2	.....Screw (M5 x 0,8 x 12mm SHCS)
10	PHSM425	4	.....Screw (M6 x 1,0 x 40mm SHCS)
11	PHSM515	6	.....Screw (M8 x 1,25 x 25mm SHCS)
12	PHSM534	4	.....Screw (M6 x 1,0 x 20mm SHCS)
13	PHSM595	4	.....Screw (M10 x 1,5 x 45mm HHCS)
14	PHSM959	6	.....Screw (M8 x 1,25 x 16mm SHCS)
15	PHSM975	1	.....Screw (M16 x 2,0 x 75mm SHCS)
16	PHSM976	1	.....Screw (M10 x 1,5 x 70mm SHCS)
17	PHSM1090	4	.....Screw (M10 x 1,5 x 30mm HHCS)
18	PHWM407	6	.....Lockwasher (M8)
19	PHWM501	6	.....Flatwasher (M8)
20	PHWM509	4	.....Lockwasher (M6)
21	PHWM521	8	.....Lockwasher (M10)
22	PHWM531	8	.....Flatwasher (M10)
23	PHWM552	1	.....Lockwasher (M16)
24	PMO1009	1	.....Servo Motor, Blower Cooled
25	PPPM547	1	.....Elbow, Male
26	PPPM618	1	.....Elbow, Male
27	SV53011	1	.....Motor Bracket
28	SV53013	1	.....Tension Block
29	SV53014	2	.....Gear Reducer Spacer
30	SV53018	1	.....Shaft Extension
31	SV53019	1	.....Gearhead Housing
32	SV53021	1	.....Bearing Housing
33	SV53022	1	.....Bearing Washer
34	SV53600	1	.....Spindle Assembly *(see Figure 2-A)*
35	SV57004	1	.....Transducer Mount

N/S indicates Not Shown

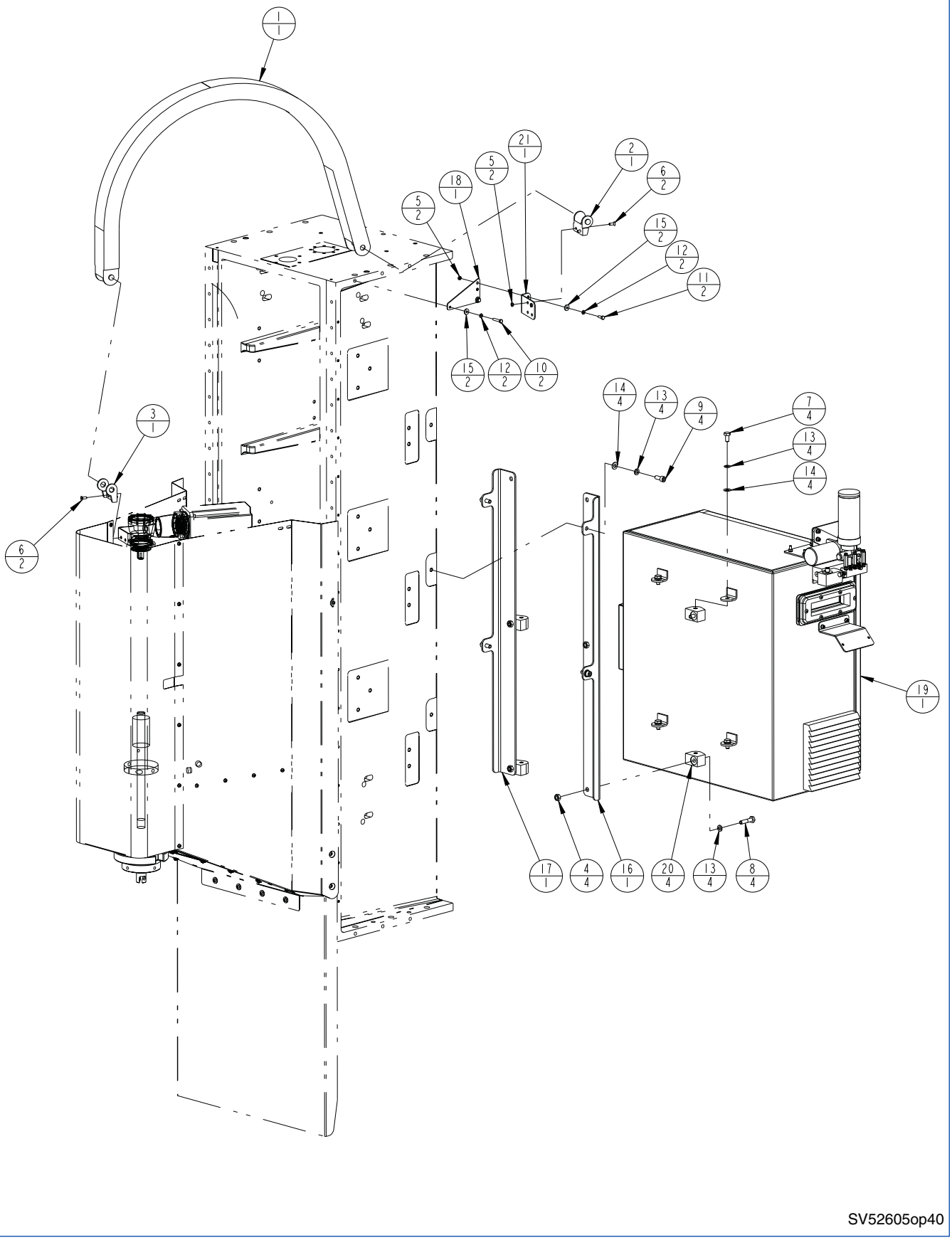

FIGURE 1-B – MACHINE COLUMN ASSEMBLY (4 OF 6)

PARTS LIST COVERING FIGURE "1-B"

ITEM NO.	**ORDER BY PART NUMBER**	QTY.	DESCRIPTION
-	**SV52605op40**	**-**	**....Machine Column Assembly** (4 of 6) *includes*
1	PEM11631	1	.....Cable Carrier Assembly
2	PEM11632	1	.....Cable Carrier Assembly
3	PEM11633	1	.....Cable Carrier Assembly
4	PHNM419	4	.....Nut, Hex (M10 x 1,5)
5	PHNM436	4	.....Nut, Self Clinching (M6 x 1,0)
6	PHSM512	4	.....Screw (M6 x 1,0 x 16mm FSHCS)
7	PHSM585	4	.....Screw (M10 x 1,5 x 20mm HHCS)
8	PHSM595	4	.....Screw (M10 x 1,5 x 45mm HHCS)
9	PHSM606	4	.....Screw (M10 x 1,5 x 25mm SHCS)
10	PHSM752	2	.....Screw (M6 x 1,0 x 30mm HHCS)
11	PHSM1089	2	.....Screw (M6 x 1,0 x 16mm HHCS)
12	PHWM509	4	.....Lockwasher (M6)
13	PHWM521	12	.....Lockwasher (M10)
14	PHWM531	8	.....Flatwasher (M10)
15	PHWM534	4	.....Flatwasher (M6)
16	SV05011	1	.....Right Enclosure Bracket
17	SV05012	1	.....Left Enclosure Bracket
18	SV22032	1	.....Energy Chain Support
19	SV22930	1	.....Column Electrical Enclosure Assembly *(see Figure 1-D)*
20	SV32899	4	.....Enclosure Mount
21	SV52028	1	.....Energy Chain Holder

N/S indicates Not Shown

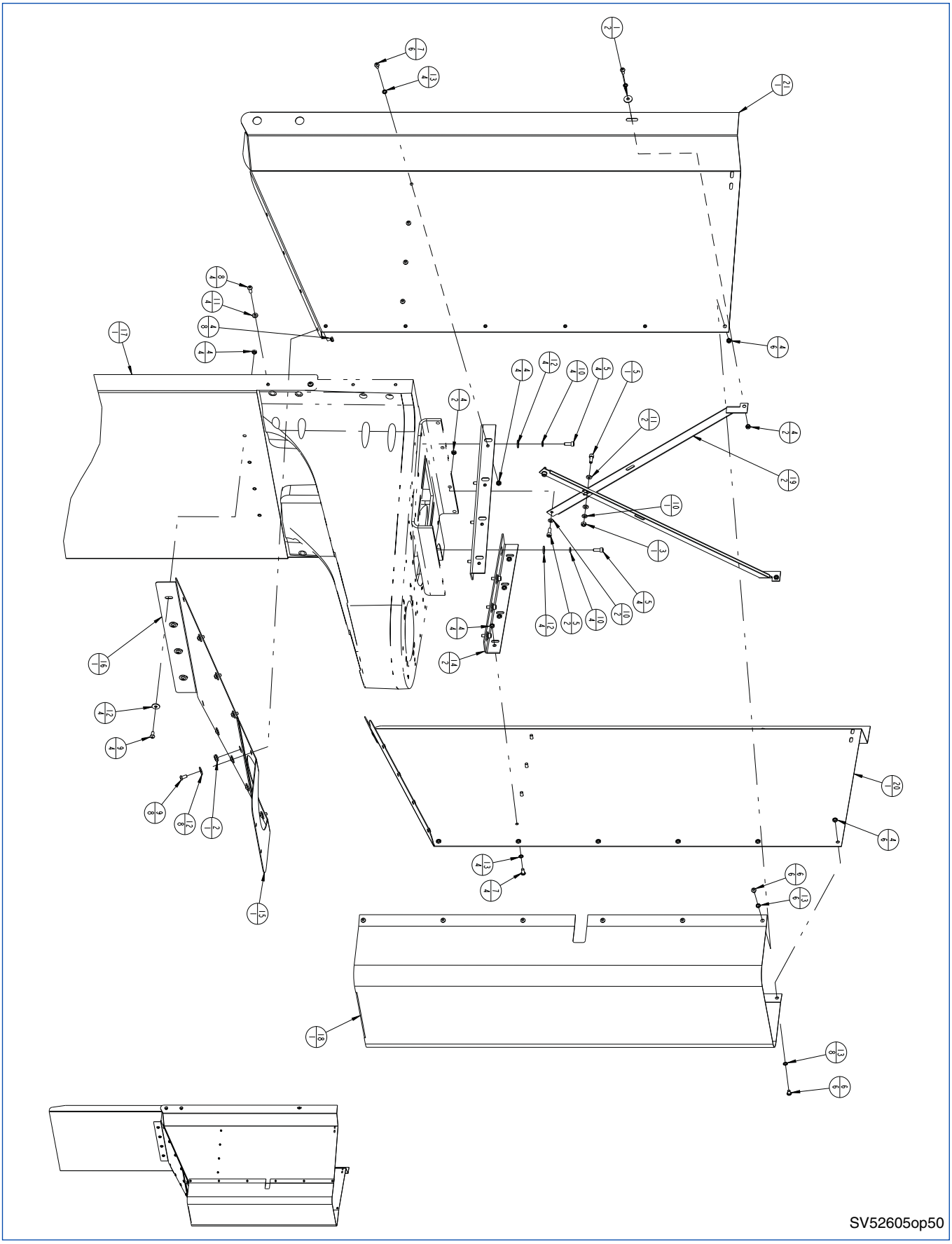

FIGURE 1-B – MACHINE COLUMN ASSEMBLY (5 OF 6)

PARTS LIST COVERING FIGURE “1-B”

ITEM NO.	ORDER BY PART NUMBER	QTY.	DESCRIPTION
-	**SV52605op50**	-	**....Machine Column Assembly** (5 of 6) *includes*
1	AN13B	2	.....Flatwasher
2	PHM866	1	.....Grommet
3	PHNM407	1	.....Nut, Hex (M6 x 1,0)
4	PHNM436	36	.....Nut, Self Clinching (M6 x 1,0)
5	PHSM405	11	.....Screw (M6 x 1,0 x 16mm SHCS)
6	PHSM508	12	.....Screw (M6 x 1,0 x 8mm BSHCS)
7	PHSM510	10	.....Screw (M6 x 1,0 x 12mm BSHCS)
8	PHSM541	4	.....Screw (M6 x 1,0 x 16mm BSHCS)
9	PHSM749	12	.....Screw (M6 x 1,0 x 12mm BSHCS)
10	PHWM509	11	.....Lockwasher (M6)
11	PHWM518	6	.....Flatwasher (M6)
12	PHWM530	20	.....Washer, Fender
13	PHWM570	22	.....Lockwasher (M6)
14	SV24101	2	.....Bracket
15	SV24117	1	.....Carriage Cover, Front
16	SV24118	1	.....Carriage Cover, Back
17	SV54102	1	.....Linear Rails Cover
18	SV54104	1	.....Front Guard Section
19	SV54112	2	.....Strap
20	SV54207	1	.....Right Side Guard - Carriage
21	SV54208	1	.....Left Side Guard - Carriage

N/S indicates Not Shown

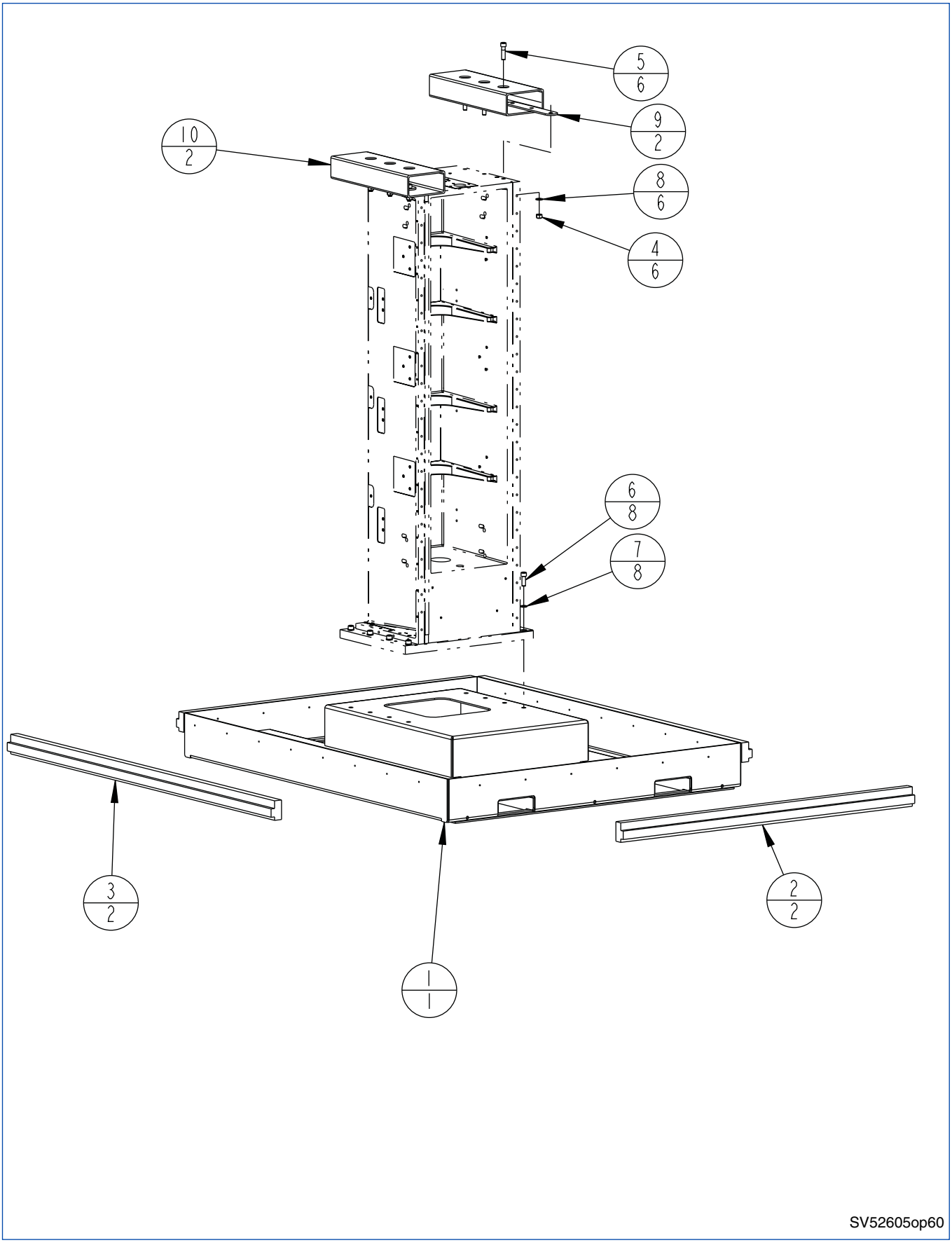

FIGURE 1-B – MACHINE COLUMN ASSEMBLY (6 OF 6)

PARTS LIST COVERING FIGURE "1-B"

ITEM NO.	**ORDER BY PART NUMBER**	QTY.	DESCRIPTION
-	**SV52605op60**	**-**	**....Machine Column Assembly** (6 of 6) *includes*
1	MSV46010	1	.....Column Shipping Skid
2	MSV46011	2	.....Nailing Ledge
3	MSV46012	2	.....Nailing Ledge
4	PHNM502	6	.....Locknut (M16 x 2,0)
5	PHSM456	6	.....Screw (M6 x 2,0 x 60mm SHCS)
6	PHSM578	8	.....Screw (M16 x 2,0 x 45mm BSHCS)
7	PHWM552	8	.....Lockwasher (M16)
8	PHWM554	6	.....Flatwasher (M16)
9	SV02121	2	.....Washer Plate
10	SV02122	2	.....Lifting Tube

N/S indicates Not Shown

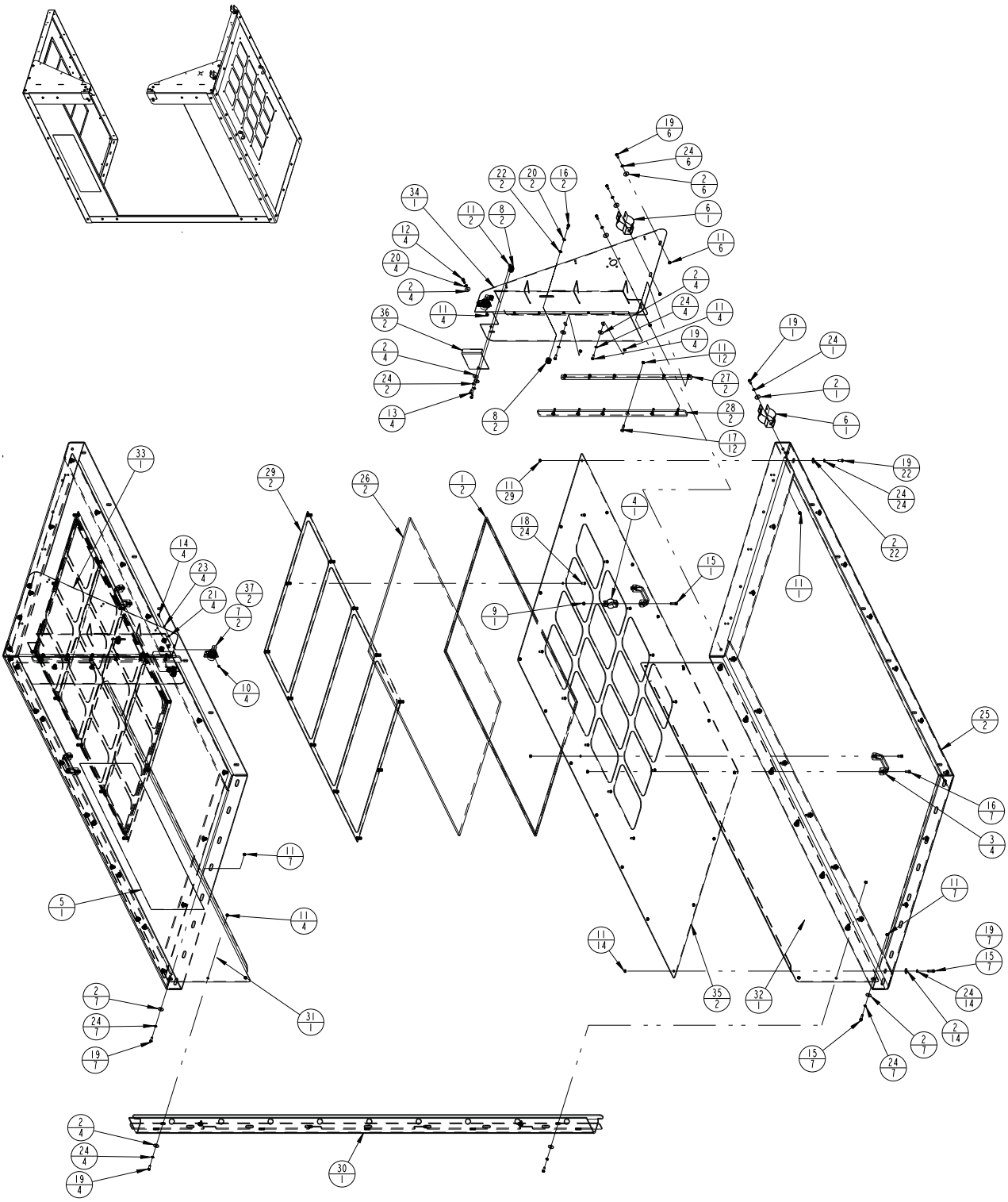

FIGURE 1-C – GUARD SET (1 OF 4)

PARTS LIST COVERING FIGURE "1-C"

ITEM NO.	ORDER BY PART NUMBER	QTY.	DESCRIPTION
-	**SV54430-1**	**-**	**....Guard Set** (1 of 4) *includes*
1	89089	2	.....Gasket
2	AN13B	73	.....Flatwasher
3	ECA7954	4	.....Handle
4	F2855	1	.....Conduit Hanger
5	PDL237	1	.....Decal
6	PEM1168	2	.....Conduit Hanger
7	PES812	2	.....Coded Magnetic Read Head
8	PHM620	4	.....Rubber Bumper
9	PHNM407	1	.....Nut, Hex (M6 x 1,0)
10	PHNM425	4	.....Nut (M4 x 1,8)
11	PHNM436	90	.....Nut (M6 x 1,0)
12	PHSM405	4	.....Screw (M6 x 1,0 x 16mm SHCS)
13	PHSM510	4	.....Screw (M6 x 1,0 x 12mm BSHCS)
14	PHSM520	4	.....Screw (M4 x 0,7 x 10mm SHCS)
15	PHSM534	15	.....Screw (M6 x 1,0 x 20mm SHCS)
16	PHSM535	9	.....Screw (M6 x 1,0 x 12mm SHCS)
17	PHSM661	12	.....Screw (M6 x 1,0 x 25mm FSHCS)
18	PHSM749	24	.....Screw (M6 x 1,0 x 12mm BSHCS)
19	PHSM971	51	.....Screw (M6 x 1,0 x 16mm BSHCS)
20	PHWM509	6	.....Lockwasher (M6)
21	PHWM516	4	.....Flatwasher (M4)
22	PHWM518	6	.....Flatwasher (M6)
23	PHWM528	4	.....Lockwasher (M4)
24	PHWM570	69	.....Lockwasher (M6)
25	SV24125	2	.....Frame
26	SV24127	2	.....Door Window
27	SV24128	2	.....Sliding Door Standoff
28	SV24129	2	.....Stationary Track
29	SV24130	2	.....Window Retainer Assembly
30	SV24135	1	.....Track
31	SV24136	1	.....Front Stationary Panel - Left
32	SV24137	1	.....Front Stationary Panel - Right
33	SV24140	1	.....Left Gusset Assembly
34	SV24145	1	.....Right Gusset Assembly
35	SV24163	2	.....Side Panel
36	SV24164	2	.....Cover
37	SV24186	2	.....Switch Bracket

N/S indicates Not Shown

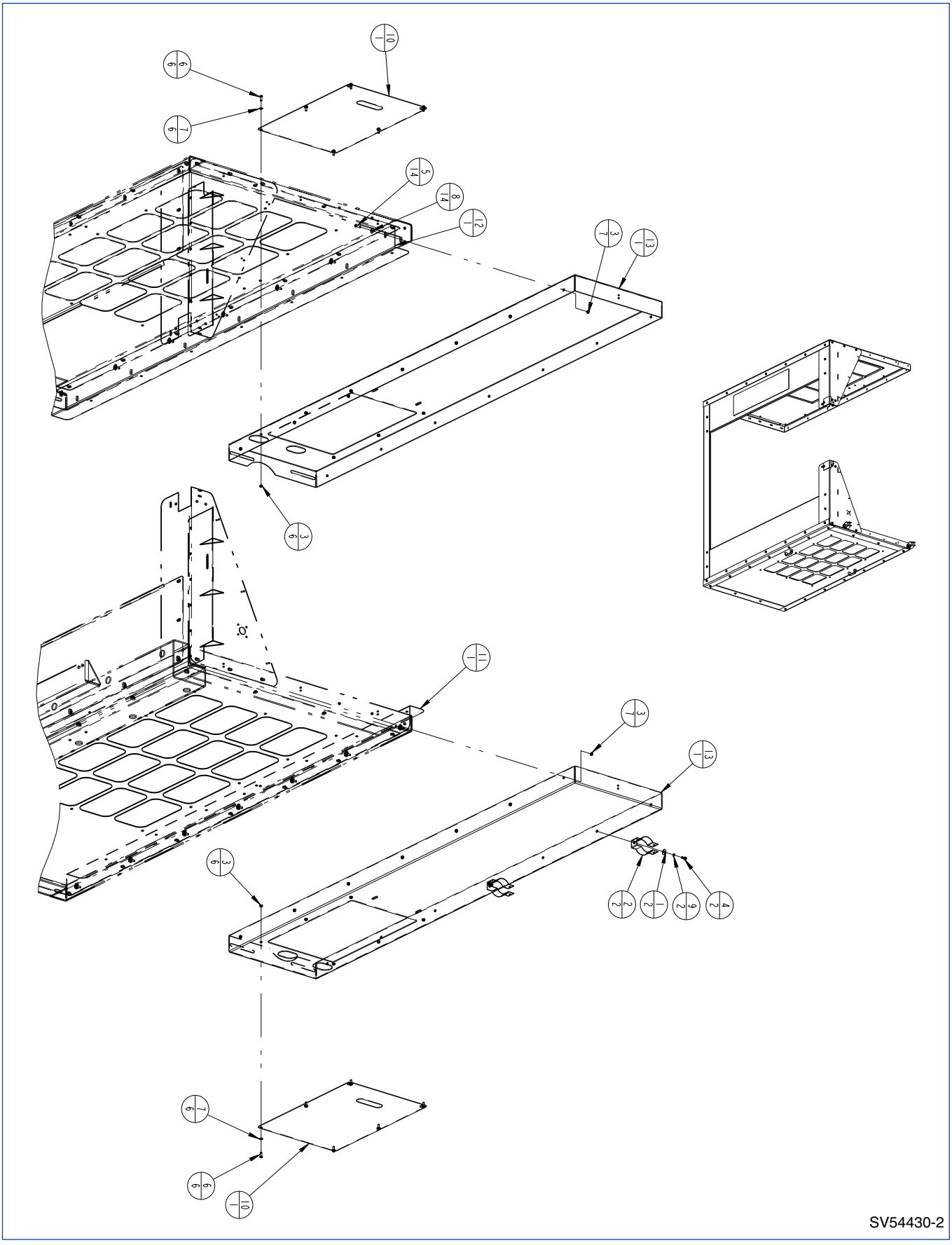

FIGURE 1-C – GUARD SET (2 OF 4)

PARTS LIST COVERING FIGURE "1-C"

ITEM NO.	**ORDER BY PART NUMBER**	QTY.	DESCRIPTION
-	**SV54430-2**	**-**	**....Guard Set** (2 of 4) *includes*
1	AN13B	2	.....Flatwasher
2	PEM1168	2	.....2 Inch Conduit Hanger
3	PHNM436	26	.....Nut, Self Clinching (M6 x 1,0)
4	PHSM535	2	.....Screw (M6 x 1,0 x 12mm SHCS)
5	PHSM794	14	.....Screw (M6 x 1,0 x 20mm BSHTS)
6	PHSM971	12	.....Screw (M6 x 1,0 x 16mm BSHTS)
7	PHW393	12	.....Flatwasher
8	PHWM530	14	.....Washer (M6)
9	PHWM570	14	.....Lockwasher (M6)
10	SV24162	2	.....Removable Side Panel
11	SV24283	1	.....Guard Bracket
12	SV24284	1	.....Guard Bracket
13	SV241462	2	.....Side Panel

N/S indicates Not Shown

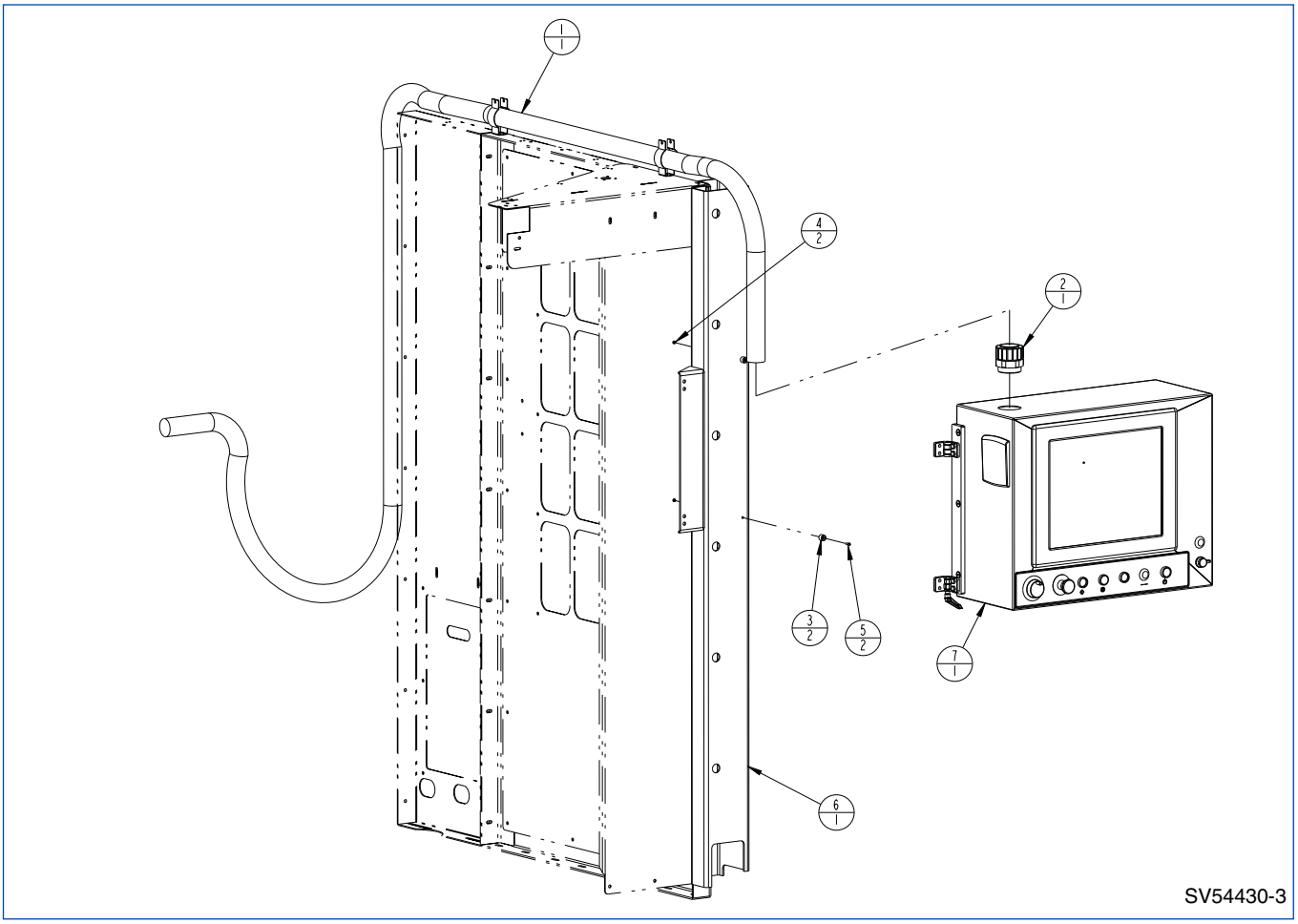

FIGURE 1-C – GUARD SET (3 OF 4)

PARTS LIST COVERING FIGURE "1-C"

ITEM NO.	**ORDER BY PART NUMBER**	QTY.	DESCRIPTION
-	**SV54430-3**	-	**....Guard Set** (3 of 4) *includes*
1	86114SV54420	1	.....2 Inch Non-Metalic Liquidtight Conduit
2	PEC371	1	.....2 Inch Conduit Connector Straight
3	PHM515	2	.....Rubber Recessed Bumper
4	PHNM425	2	.....Nut, Insert (M4 x 1,8)
5	PHSM490	2	.....Screw (M4 x 0,7 x 12mm SHCS)
6	SV24265	1	.....Post Assembly
7	SV24580	1	.....Operator Station Assembly *(see Figure 1-F)*

N/S indicates Not Shown

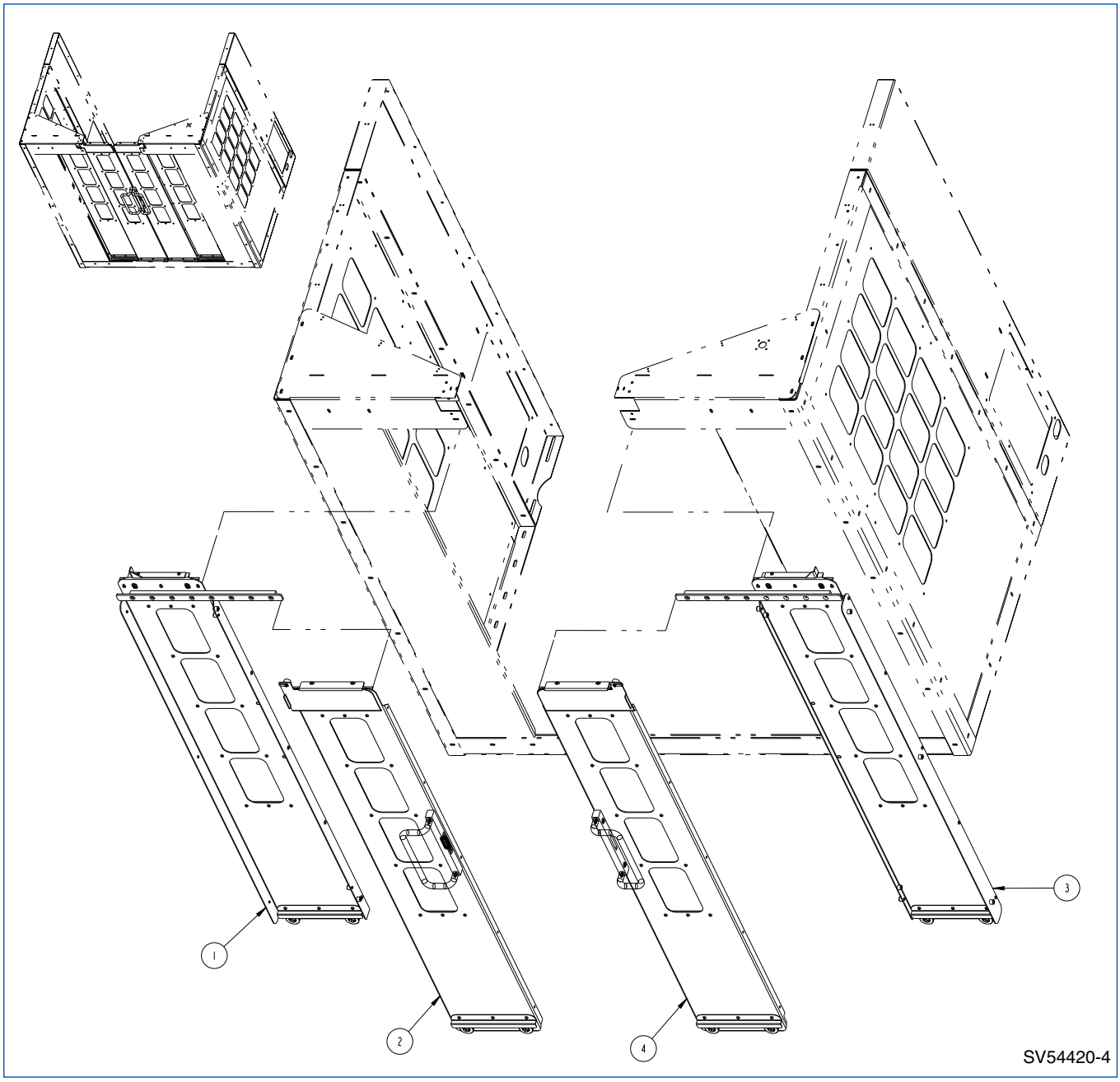

FIGURE 1-C – GUARD SET (4 OF 4)

PARTS LIST COVERING FIGURE "1-C"

ITEM NO.	**ORDER BY PART NUMBER**	QTY.	DESCRIPTION
-	**SV54430-4**	**-**	**....Guard Set** (4 of 4) *includes*
1	SV24450	1	.....Left Door Assembly - Panel One *(see Figure 2-C)*
2	SV24460	1	.....Left Door Assembly - Panel Two *(see Figure 2-D)*
3	SV24465	1	.....Right Door Assembly - Panel One *(see Figure 2-E)*
4	SV24470	1	.....Right Door Assembly - Panel Two *(see Figure 2-F)*

N/S indicates Not Shown

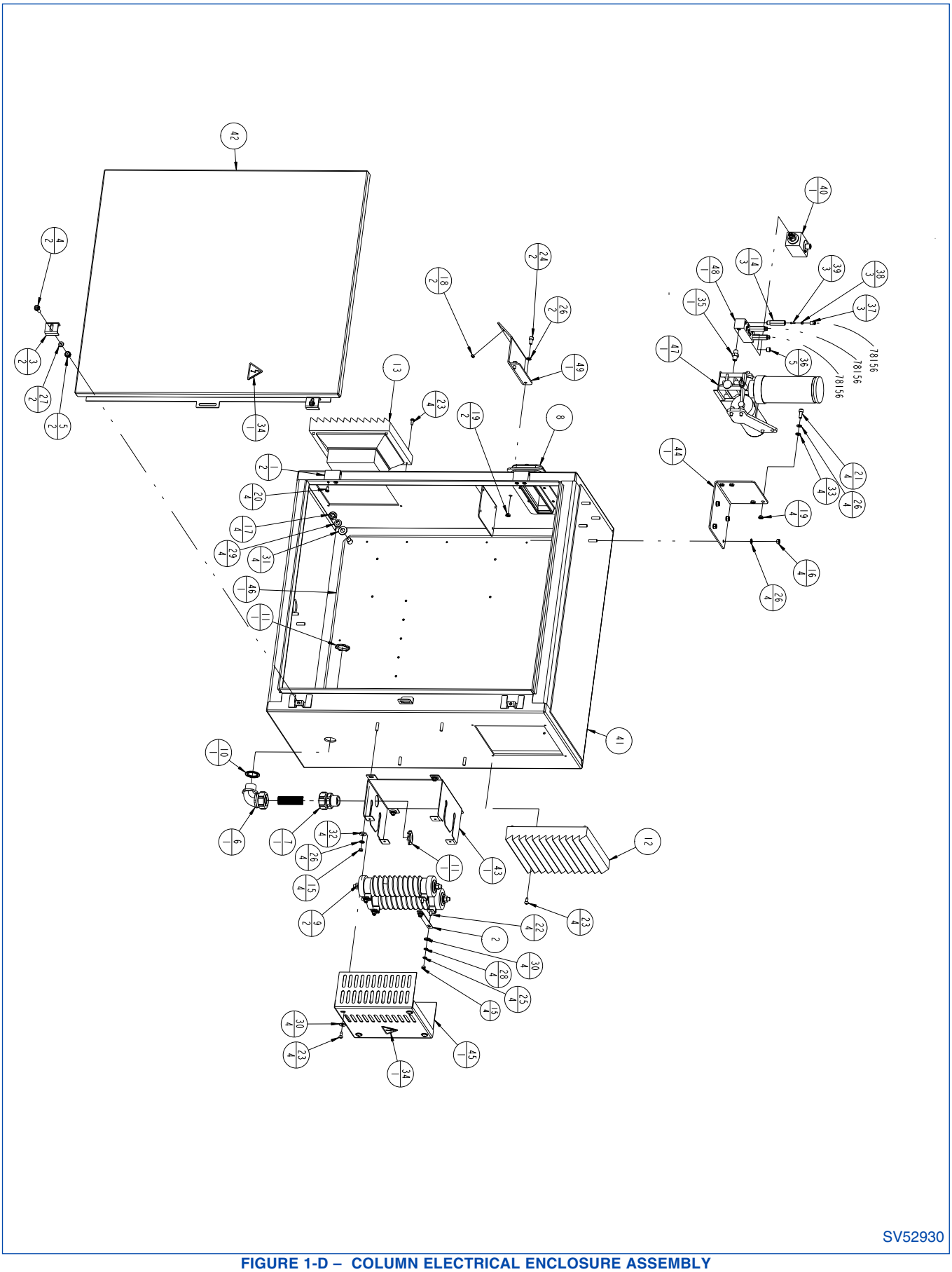

FIGURE 1-D – COLUMN ELECTRICAL ENCLOSURE ASSEMBLY

PARTS LIST COVERING FIGURE "1-D"

ITEM NO.	ORDER BY PART NUMBER	QTY.	DESCRIPTION
-	**SV22930**	-	**....Column Electrical Enclosure Assembly** *includes*
1	CK6172	2	.....Enclosure Hinge Half
2	EC3809	1	.....Bus Bar
3	HBS2643	2	.....Hold Down Bracket
4	HBS2644	2	.....Clip Bolt
5	HBS2646	2	.....Clip Spring
6	PEC127	1	.....Conduit Connector
7	PEC128	2	.....Conduit Connector
8	PEC318	1	.....Frame
9	PED46	2	.....Resistor, 12.5 Ohm, 420 W
10	PEM251	1	.....Sealing 'O' Ring With Retainer
11	PEM301	2	.....Locknut
12	PEM655	1	.....Outlet Filter
13	PEM810	1	.....Filter Fan
14	PFC175	3	.....Metering Valve
15	PHNM405	8	.....Nut, Hex (M5 x 0,8)
16	PHNM407	4	.....Nut, Hex (M6 x 1,0)
17	PHNM419	4	.....Nut, Hex (M10 x 1,5)
18	PHNM434	2	.....Nut, Insert (M5 x 1,8)
19	PHNM436	6	.....Nut, Self Clinching (M6 x 1,0)
20	PHS511	4	.....Screw (#10-24 x 3/8 BSHCS)
21	PHSM405	4	.....Screw (M6 x 1,0 x 16mm SHCS)
22	PHSM432	4	.....Screw (M5 x 0,8 x 12mm BSHCS)
23	PHSM438	12	.....Screw (M5 x 0,8 x 12mm PPHTCS)
24	PHSM535	2	.....Screw (M6 x 1,0 x 12mm SHCS)
25	PHWM406	4	.....Lockwasher (M5)
26	PHWM509	14	.....Lockwasher (M6)
27	PHWM518	2	.....Flatwasher (M6)
28	PHWM519	4	.....Flatwasher (M5)
29	PHWM521	4	.....Lockwasher (M10)
30	PHWM529	8	.....Washer, Fender (M5)
31	PHWM531	4	.....Flatwasher (M10)
32	PHWM534	4	.....Flatwasher (M6)
33	PHWM541	4	.....Flatwasher (M6)
34	PNP299	2	.....Decal, Electrical
35	PPPM430	1	.....Nipple
36	PPPM449	5	.....Hex Socket Pipe Plug
37	PPPM470	3	.....Compression Bushing
38	PPPM471	3	.....Compression Sleeve
39	PPPM472	3	.....Tubing Insert
40	SV02202	1	.....Pressure Switch Assembly
41	SV02910	1	.....Column Electrical Enclosure
42	SV02925	1	.....Door Weldment
43	SV02931	1	.....Braking Resistor Holder
44	SV22923	1	.....Grease Unit Bracket
45	SV22932	1	.....Braking Resistor Cover
46	SV22940	1	.....Electrical Panel *(see Figure 3-A)*
47	SV31201	1	.....Grease Pump
48	SV31209	1	.....Grease Distribution Block
49	SV55953	1	.....Energy Chain Support Bracket
-	78156	30'	.....Nylon Tubing (5/32 OD)

N/S indicates Not Shown

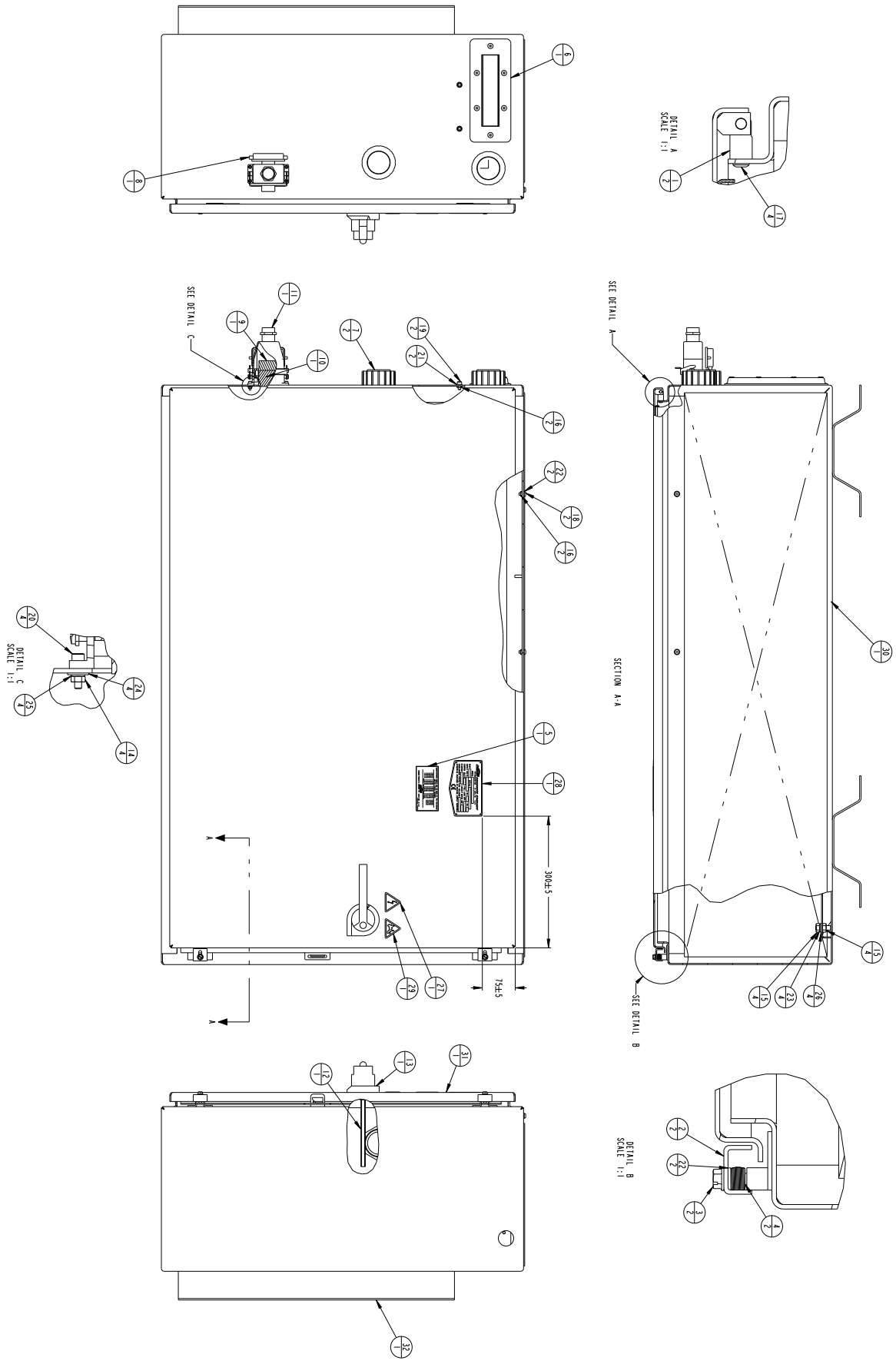

FIGURE 1-E – BASE ELECTRICAL ENCLOSURE ASSEMBLY

PARTS LIST COVERING FIGURE "1-E"

ITEM NO.	ORDER BY PART NUMBER	QTY.	DESCRIPTION
-	**SV53940**	-	**....Base Electrical Enclosure Assembly** *includes*
1	CK6172	2	.....Enclosure Hinge Half
2	HBS2643	2	.....Hold Down Bracket
3	HBS2644	2	.....Clip Bolt
4	HBS2646	2	.....Clip Spring
5	LTA1015	1	.....Label, Patent
6	PEC318	1	.....Frame
7	PEC371	2	.....Conduit Connector (2")
8	PEM460	1	.....Panel Mount Base
9	PEM461	1	.....10 Position Male Insert
10	PEM462	1	.....10 Position Female Insert
11	PEM982	1	.....Heavy Duty Hood With 10 Pin And Single Lever
12	PEM991	1	.....Disconnect Shaft
13	PEM992	1	.....Handle
14	PHNM402	4	.....Nut, Hex (M4 x 0,7)
15	PHNM419	8	.....Nut, Hex (M10 x 1,5)
16	PHNM436	2	.....Nut, Self Clinching (M6 x 1,0)
17	PHS511	4	.....Screw (#10-24 x 3/8 BSHCS)
18	PHSM510	2	.....Screw (M6 x 1,0 12mm BSHCS)
19	PHSM535	2	.....Screw (M6 x 1,0 12mm SHCS)
20	PHSM613	4	.....Screw (M4 x 0,7 16mm SHCS)
21	PHWM509	2	.....Lockwasher (M6)
22	PHWM518	2	.....Flatwasher (M6)
23	PHWM521	4	.....Lockwasher (M10)
24	PHWM527	4	.....Washer, Fender (M4)
25	PHWM528	4	.....Lockwasher (M4)
26	PHWM531	4	.....Flatwasher (M10)
27	PNP299	1	.....Decal, Elcetrical
28	PNP325	1	.....Label, CE
29	PNP529	1	.....Arc Flash Warning Label
30	SV25615	1	.....Base Electrical Panel Assembly *(see Figure 3-B)*
31	SV55925	1	.....Door Weldment
32	SV55965	1	.....Base Electrical Enclosure

N/S indicates Not Shown

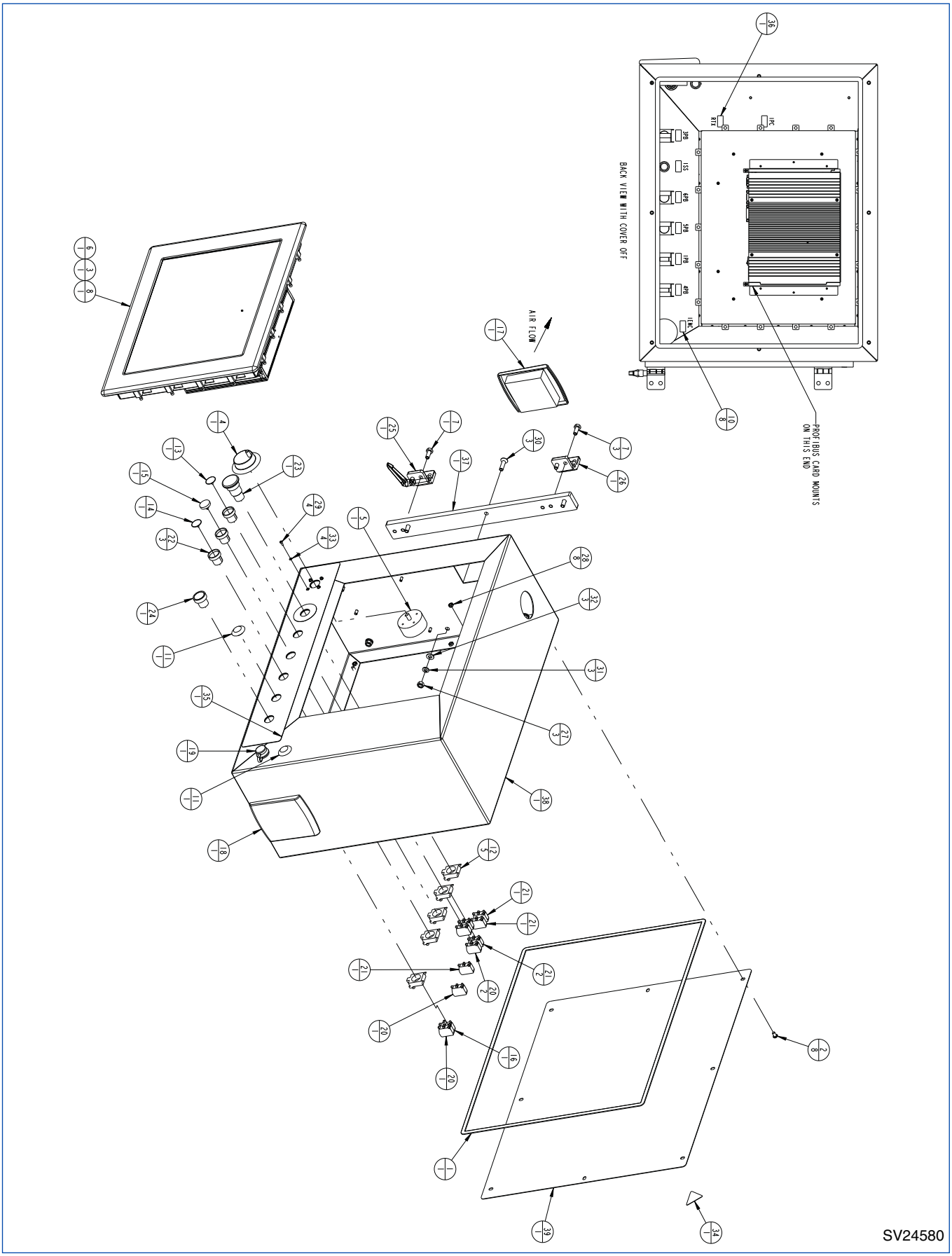

FIGURE 1-F – OPERATOR STATION ASSEMBLY

PARTS LIST COVERING FIGURE "1-F"

ITEM NO.	ORDER BY PART NUMBER	QTY.	DESCRIPTION
-	**SV24580**	**-**	**....Operator Station Assembly** *includes*
1	89089-7	1	.....Gasket
2	HL497	8	.....Screw (M6 x 1,0 x 10mm BSHCS)
3	PEC368	1	.....Profibus Connector With Pg Port
4	PED2166-1	1	.....Manual Pulse Generator, Hand Wheel
5	PED2166-2	1	.....Manual Pulse Generator
6	PED2168	1	.....Profibus Card
7	PHSM495	4	.....Screw (M8 x 1,25 x 20mm HHCS)
8	PED3198	1	.....Phoenix Valueline
9	- - -	-	- - -
10	PEM154LB	8	.....Wire & Cable Marking Label
11	PEM823	2	.....Knockout Plug
12	PEM961	5	.....Mounting Collar, Die Cast
13	PEM966	1	.....Push Button Cap, Flush Green
14	PEM967	1	.....Push Button Cap, Flush Blue
15	PEM968	1	.....Push Button Cap, Extended Red
16	PEM970	1	.....Light Block, Led White, Screw Clamp Terminals
17	PEM1338	1	.....Enclosure Fan, 24VDC
18	PEM1339	1	.....Fan Outlet Grill
19	PEM1342	1	.....USB Connector
20	PES644	4	.....Contact, No. Screw Term.
21	PES648	2	.....Contact, Nc, Screw Terminal
22	PES654	3	.....Pushbutton Head W/O Cap
23	PES655	1	.....Pushbutton, Red Mushroom
24	PES656	1	.....Pushbutton, Illuminated, White
25	PHM633	1	.....Locking Hinge
26	PHM634	1	.....Hinge
27	PHNM401	3	.....Nut, Hex (M8 x 1,25)
30	PHSM738	3	.....Screw
31	PHWM407	3	.....Lockwasher (M8)
32	PHWM501	3	.....Flatwasher (M8)
33	PHWM533	4	.....Lockwasher (M3)
34	PNP299	1	.....Electrical Decal
35	PNP393	1	.....Control Panel Overlay
37	SV24269	1	.....Operator Station Hinge Plate
38	SV24500	1	.....Operator Station Enclosure Assembly *(see Figure 3-B)*
39	SV34724	1	.....Back Plate

N/S indicates Not Shown

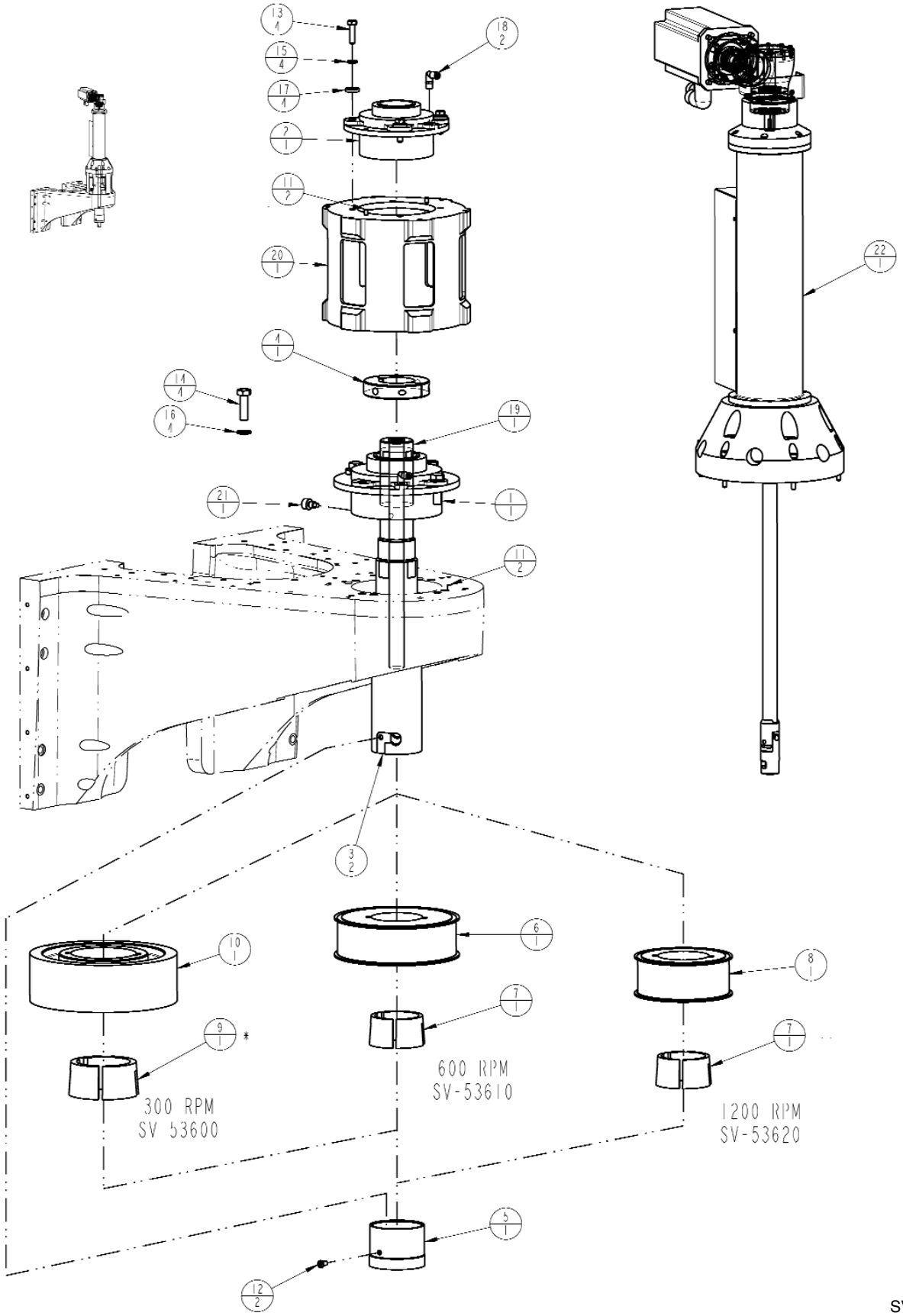

FIGURE 2-A – SPINDLE ASSEMBLY

PARTS LIST COVERING FIGURE "2-A"

ITEM NO.	**ORDER BY PART NUMBER**	QTY.	DESCRIPTION
-	**SV53600**	**-**	**....Spindle Assembly** *includes*
1	F4891	1	.....Spherical Bearing
2	F4895	1	.....Spherical Roller Bearing
3	G16A143	2	.....Reversing Key
4	G200B679	1	.....Spindle Nut
5	G35B1061	1	.....Sleeve Lock
6	PHM232	1	.....Sprocket (600 RPM)
7	PHM234	2	.....Bushing
8	PHM232	1	.....Sprocket (1200 RPM)
9	PHM234	1	.....Bushing
10	PHM235	1	.....Sprocket (300 RPM)
11	PHPM416	4	.....Spring Pin
12	PHS652	2	.....Screw (1/4-20 x 1/2 BSHCS)
13	PHSM498	4	.....Screw (M8 x 1,25 x 30mm HHCS)
14	PHSM795	4	.....Screw
15	PHWM407	4	.....Lockwasher (M8)
16	PHWM408	4	.....Lockwasher (M12)
17	PHWM532	4	.....Flatwasher (M8)
18	PPP294	2	.....Swivel Elbow
19	SV53001	1	.....Spindle Shaft
20	SV53002	1	.....Spindle Housing
21	SV53017	1	.....Screw, Dog Point
22	SV53050	1	.....Linear Feed System *(see Figure 2-B)*

N/S indicates Not Shown

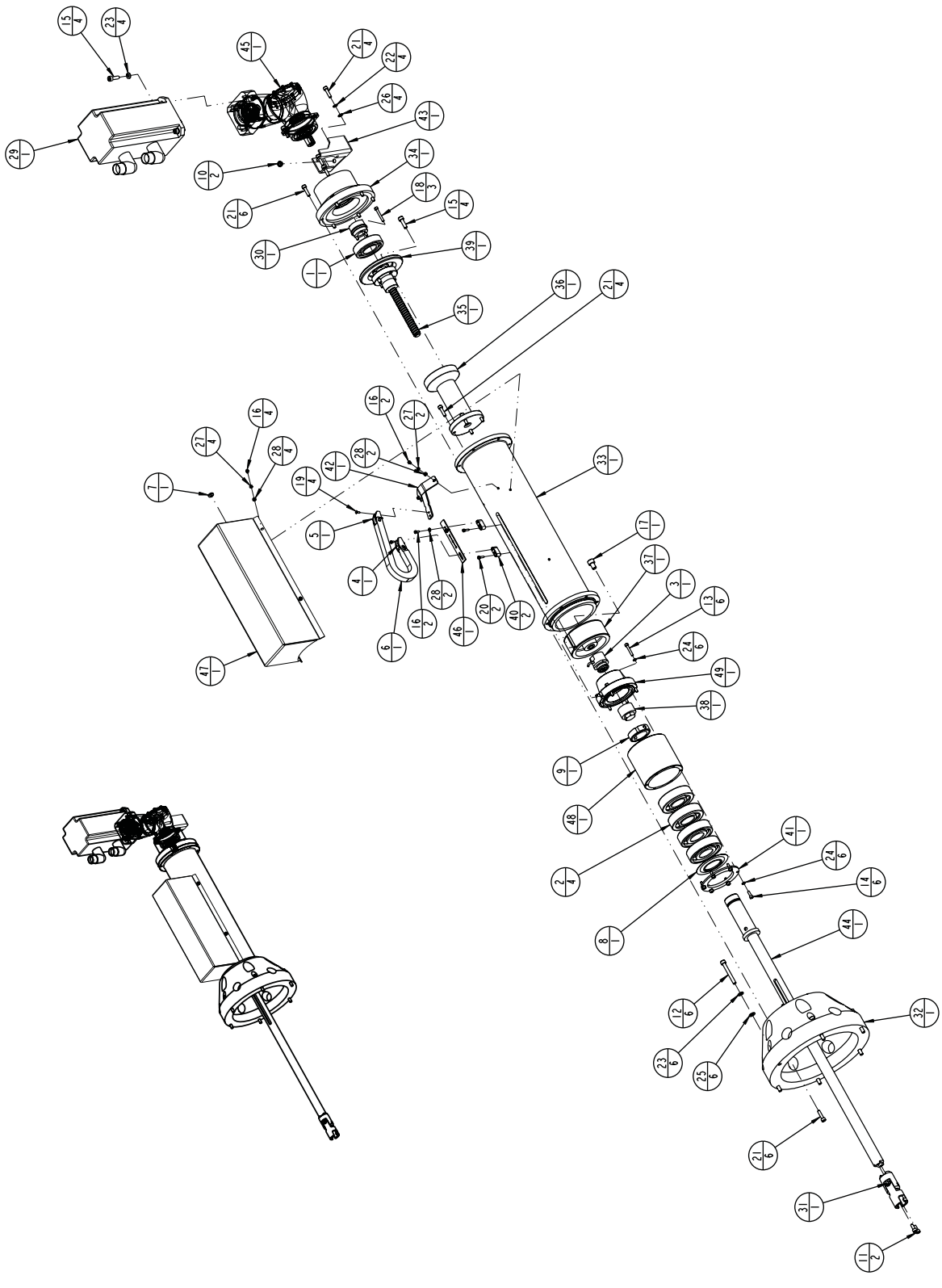

FIGURE 2-B – LINEAR FEED SYSTEM

PARTS LIST COVERING FIGURE "2-B"

ITEM NO.	ORDER BY PART NUMBER	QTY.	DESCRIPTION
-	**SV53050**	-	**....Linear Feed System** *includes*
1	PBR339	1	.....4 Point Contact Angular Ball Bearing
2	PBR341	4	.....Single Row Angular Contact Bearing
3	PED3126	1	.....Slim Line Force Link
4	PEM11081	1	.....Cable Carrier End Bracket Set
5	PEM11082	1	.....Cable Carrier End Bracket Set
6	PEM1116	1	.....Cable Carrier
7	PHM737	1	.....Grommet
8	PHM840	1	.....Sealing Ring
9	PHM841	1	.....Precision Locknut (30 x 1,5mm)
10	PHNM436	2	.....Nut, Self Clinching (M6 x 1,0)
11	PHSM401	2	.....Screw (M5 x 0,8 x 12mm SHCS)
12	PHSM426	6	.....Screw (M6 x 1,0 x 50mm SHCS)
13	PHSM437	6	.....Screw (M4 x 0,7 x 25mm SHCS)
14	PHSM490	6	.....Screw (M4 x 0,7 x 12mm SHCS)
15	PHSM534	8	.....Screw (M6 x 1,0 x 20mm SHCS)
16	PHSM550	8	.....Screw (M3 x 0,5 x 8mm SHCS)
17	PHSM555	1	.....Screw (M8 x 1,25 x 12mm SHCS)
18	PHSM574	3	.....Screw (M4 x 0,7 x 30mm SHCS)
19	PHSM662	4	.....Screw (M3 x 0,5 x 8mm FSHCS)
20	PHSM962	2	.....Screw (M3 x 0,5 x 12mm SHCS)
21	PHSM963	20	.....Screw (M5 x 0,8 x 20mm SHCS)
22	PHWM406	4	.....Lockwasher (M5)
23	PHWM509	10	.....Lockwasher (M6)
24	PHWM517	12	.....Lock Washer (M4)
25	PHWM518	6	.....Flatwasher (M6)
26	PHWM519	4	.....Flatwasher (M5)
27	PHWM533	6	.....Lockwasher (M3)
28	PHWM555	8	.....Flatwasher (M3)
29	PMO995	1	.....Servo Motor With Absolute Encoder
30	SV33683	1	.....Ball Screw Coupling
31	SV53010	1	.....Feed Rod Coupling Assembly
32	SV53041	1	.....Feed Unit Adapter
33	SV53042	1	.....Feed System Housing
34	SV53043	1	.....Gear Reducer Base
35	SV53045	1	.....Ballscrew Assembly
36	SV53046	1	.....Ball Nut Housing
37	SV53047	1	.....Piston
38	SV53049	1	.....Nut
39	SV53051	1	.....Ring
40	SV53052	2	.....Key
41	SV53054	1	.....Bearing End Cap
42	SV53056	1	.....Cable Carrier Base
43	SV53057	1	.....Cable Carrier Base
44	SV53058	1	.....Ffed Rod Assembly
45	SV53059	1	.....Right Angle Gearbox
46	SV53061	1	.....Cable Shield
47	SV53062	1	.....Feed System Cover
48	SV53063	1	.....Bearing Housing
49	SV53064	1	.....Bearing End Cap

N/S indicates Not Shown

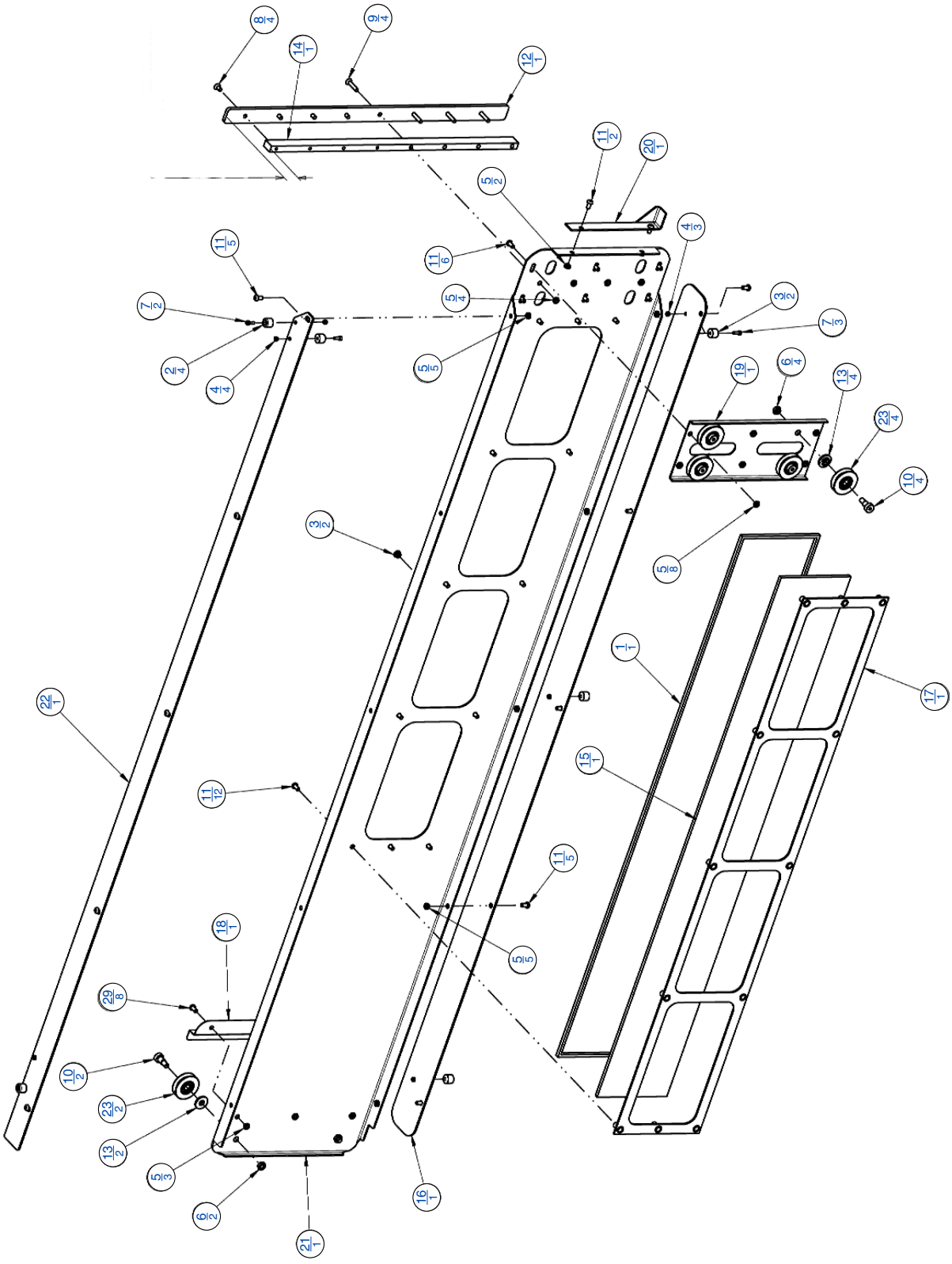

FIGURE 2-C – DOOR ASSEMBLY, LEFT PANEL ONE

PARTS LIST COVERING FIGURE "2-C"

ITEM NO.	**ORDER BY PART NUMBER**	QTY.	DESCRIPTION
-	**SV24450**	**-**	**....Door Assembly, Left Panel One** *includes*
1	89089	1	....Gasket
2	PHM515	7	....Rubber Recessed Bumper
3	PHM758	2	....Plug
4	PHNM425	7	....Nut, Insert (M4 x 1,8)
5	PHNM436	25	....Nut, Self Clinching (M6 x 1,0)
6	PHNM467	6	....Nut, Insert (M8 x 1,8)
7	PHSM490	7	....Screw (M4 x 0,7 x 12mm SHCS)
8	PHSM511	4	....Screw, Black Oxide
9	PHSM554	4	....Screw (M6 x 1,0 x 30mm FSHCS)
10	PHSM654	6	....Screw (M10 x 12mm SHSS)
11	PHSM749	33	....Screw (M6 x 1,0 x 12mm BSHCS)
12	SV24148	1	....Outer Track
13	SV24149	6	....Trolley Spacer
14	SV24151	1	....Spacer
15	SV24152	1	....Door Window
16	SV24154	1	....Splash Shield
17	SV24155	1	....Window Retainer Assembly
18	SV24157	1	....Splash Guard
19	SV24158	1	....Support Plate
20	SV24159	1	....Stop
21	SV24192	1	....Door
22	SV24193	1	....Splash Shield
23	SV24205	6	....Roller Assembly

N/S indicates Not Shown

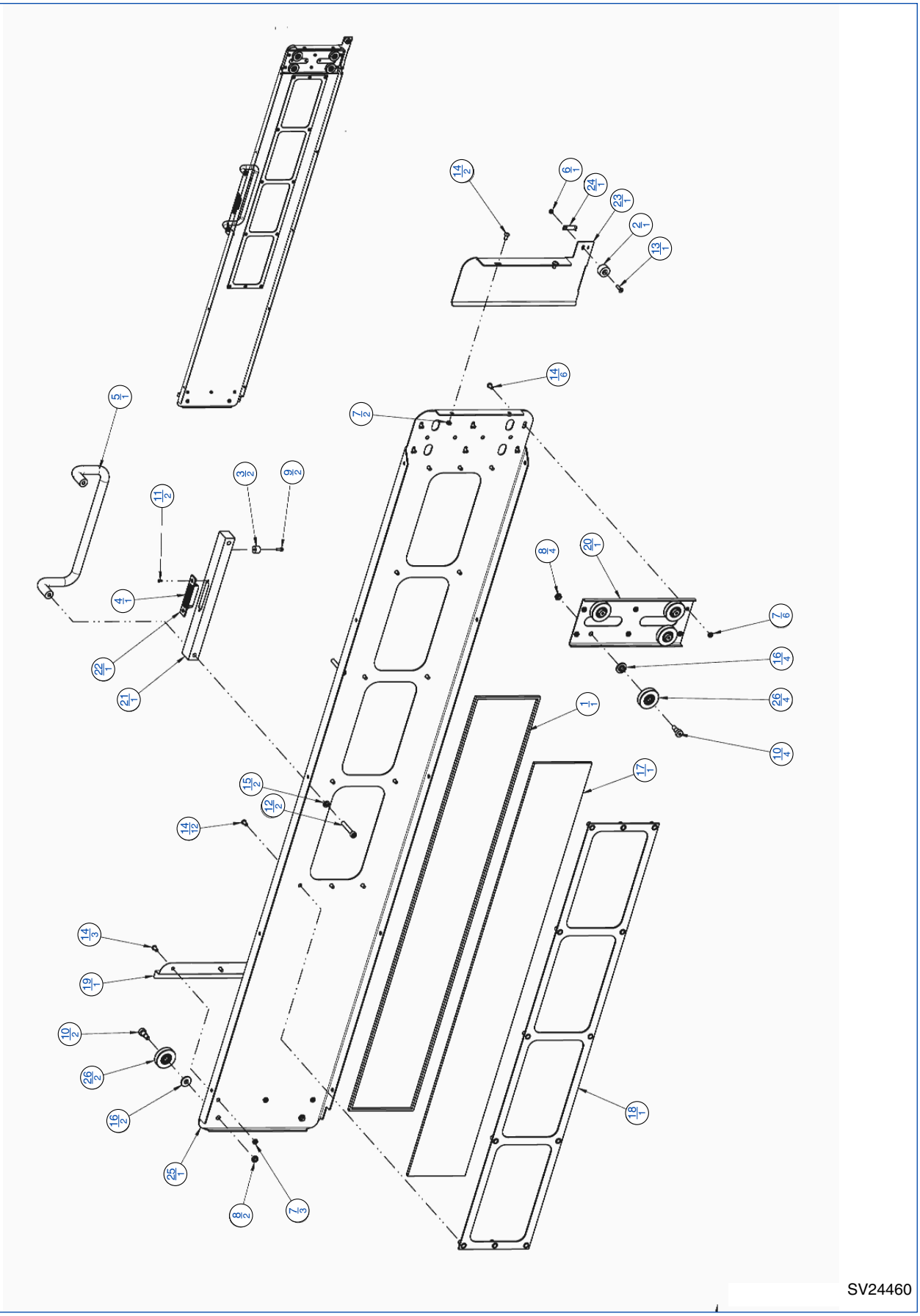

FIGURE 2-D – DOOR ASSEMBLY, LEFT PANEL TWO

PARTS LIST COVERING FIGURE "2-D"

ITEM NO.	ORDER BY PART NUMBER	QTY.	DESCRIPTION
-	**SV24460**	**-**	**....Door Assembly, Left Panel Two** *includes*
1	89089	1	....Gasket
2	- - -	-	....Coded Magnetic Actuator *(see Fig. 1-C)*
3	PHM515	2	....Rubber Recessed Bumper
4	PHM621	1	....Magnetic Latch
5	PHM622	1	....Cabinet Handle
6	PHNM434	1	....Nut, Insert (M5 x 1,8)
7	PHNM436	11	....Nut, Self Clinching (M6 x 1,0)
8	PHNM467	6	....Nut, Insert (M8 x 1,8)
9	PHSM490	2	....Screw (M4 x 0,7 x 12mm SHCS)
10	PHSM654	6	....Screw (M10 x 12mm SHSS)
11	PHSM662	2	....Screw (M3 x 0,5 x 8mm FSHCS)
12	PHSM697	2	....Screw (M8 x 1,25 x 50mm SHCS)
13	PHSM699	1	....Screw (M3 x 0,8 x 20mm FSHCS)
14	PHSM749	23	....Screw (M6 x 1,0 x 12mm BSHCS)
15	PHWM407	2	....Lockwasher (M8)
16	SV24149	6	....Trolley Spacer
17	SV24152	1	....Door Window
18	SV24155	1	....Window Retainer Assembly
19	SV24157	1	....Splash Guard
20	SV24158	1	....Support Plate
21	SV24169	1	....Handle Extension
22	SV24176	1	....Magnet Housing
23	SV24183	1	....Nut Tag
24	SV24181	1	....Side Back Panel
25	SV24192	1	....Door
26	SV24205	6	....Roller Assembly

N/S indicates Not Shown

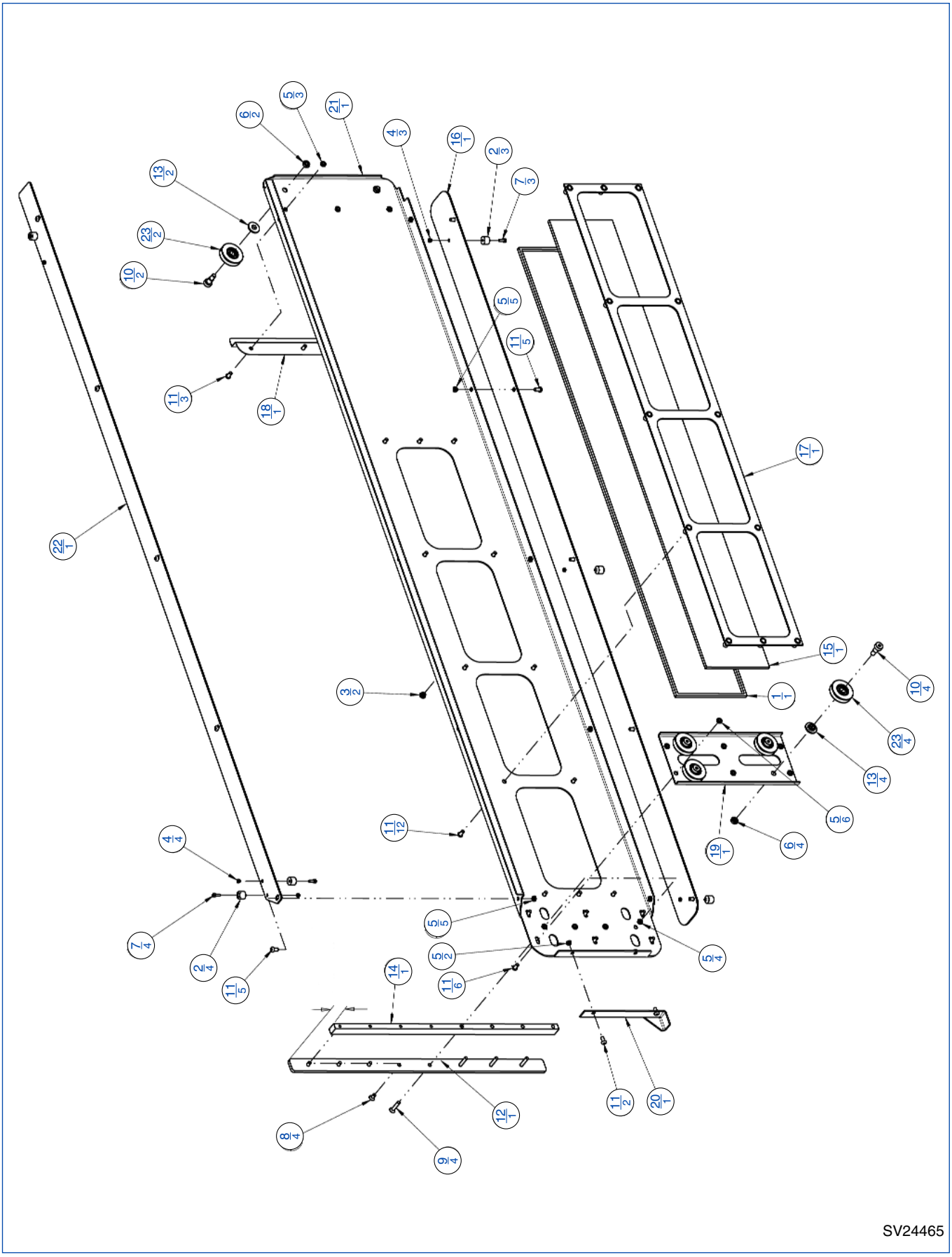

FIGURE 2-E – DOOR ASSEMBLY, RIGHT PANEL ONE

PARTS LIST COVERING FIGURE "2-E"

ITEM NO.	**ORDER BY PART NUMBER**	QTY.	DESCRIPTION
-	**SV24465**	**-**	**....Door Assembly, Right Panel One** *includes*
1	89089	1	....Gasket
2	PHM515	7	....Rubber Recessed Bumper
3	PHM758	2	....Plug
4	PHNM425	7	....Nut, Insert (M4 x 1,8)
5	PHNM436	25	....Nut, Self Clinching (M6 x 1,0)
6	PHNM467	6	....Nut, Insert (M8 x 1,8)
7	PHSM490	7	....Screw (M4 x 0,7 x 12mm SHCS)
8	PHSM511	4	....Screw, Black Oxide
9	PHSM554	4	....Screw (M6 x 1,0 x 30mm FSHCS)
10	PHSM654	6	....Screw (M10 x 12mm SHSS)
11	PHSM749	33	....Screw (M6 x 1,0 x 12mm BSHCS)
12	SV24148	1	....Outer Track
13	SV24149	6	....Trolley Spacer
14	SV24151	1	....Spacer
15	SV24152	1	....Door Window
16	SV24154	1	....Splash Shield
17	SV24155	1	....Window Retainer Assembly
18	SV24157	1	....Splash Guard
19	SV24158	1	....Support Plate
20	SV24161	1	....Stop
21	SV24191	1	....Door
22	SV24193	1	....Splash Shield
23	SV24205	6	....Roller Assembly

N/S indicates Not Shown

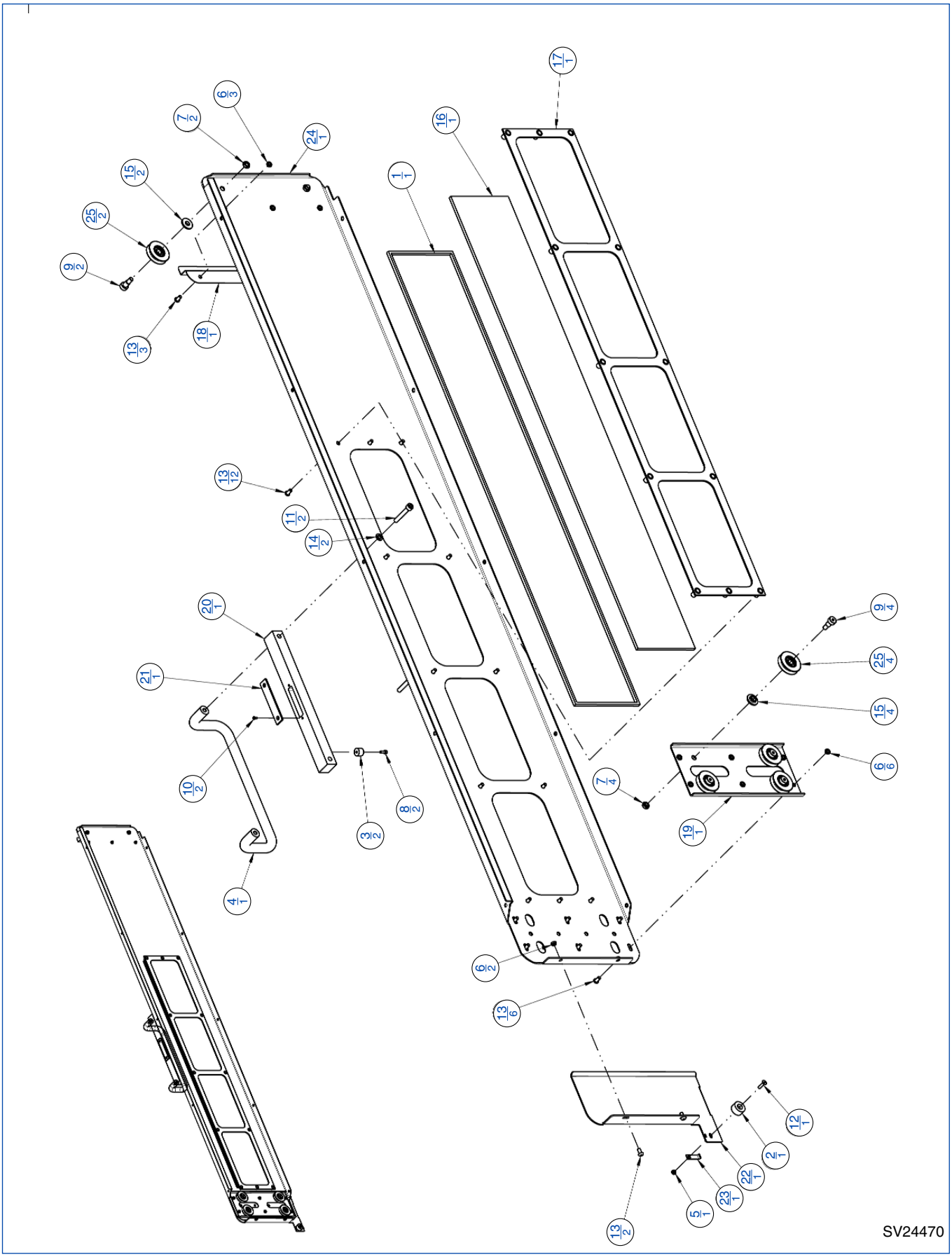

FIGURE 2-F – DOOR ASSEMBLY, RIGHT PANEL TWO

PARTS LIST COVERING FIGURE "2-F"

ITEM NO.	ORDER BY PART NUMBER	QTY.	DESCRIPTION
-	**SV24470**	**-**	**....Door Assembly, Right Panel Two** *includes*
1	89089	1	....Gasket
2	- - -	-	....Coded Magnetic Actuator *(see Fig. 1-C)*
3	PHM515	2	....Rubber Recessed Bumper
4	PHM622	1	....Cabinet Handle
5	PHNM434	1	....Nut, Insert (M5 x 1,8)
6	PHNM436	11	....Nut, Self Clinching (M6 x 1,0)
7	PHNM467	6	....Nut, Insert (M8 x 1,8)
8	PHSM490	2	....Screw (M4 x 0,7 x 12mm SHCS)
9	PHSM654	6	....Screw (M10 x 12mm SHSS)
10	PHSM662	2	....Screw (M3 x 0,5 x 8mm FSHCS)
11	PHSM697	2	....Screw (M8 x 1,25 x 50mm SHCS)
12	PHSM699	1	....Screw (M3 x 0,8 x 20mm FSHCS)
13	PHSM749	23	....Screw (M6 x 1,0 x 12mm BSHCS)
14	PHWM407	2	....Lockwasher (M8)
15	SV24149	6	....Trolley Spacer
16	SV24152	1	....Door Window
17	SV24155	1	....Window Retainer Assembly
18	SV24157	1	....Splash Guard
19	SV24158	1	....Support Plate
20	SV24169	1	....Handle Extension
21	SV24177	1	....Magnet Target
22	SV24184	1	....Cover - Right
23	SV24187	1	....Nut Tag
24	SV24191	1	....Door
25	SV24205	6	....Roller Assembly

N/S indicates Not Shown

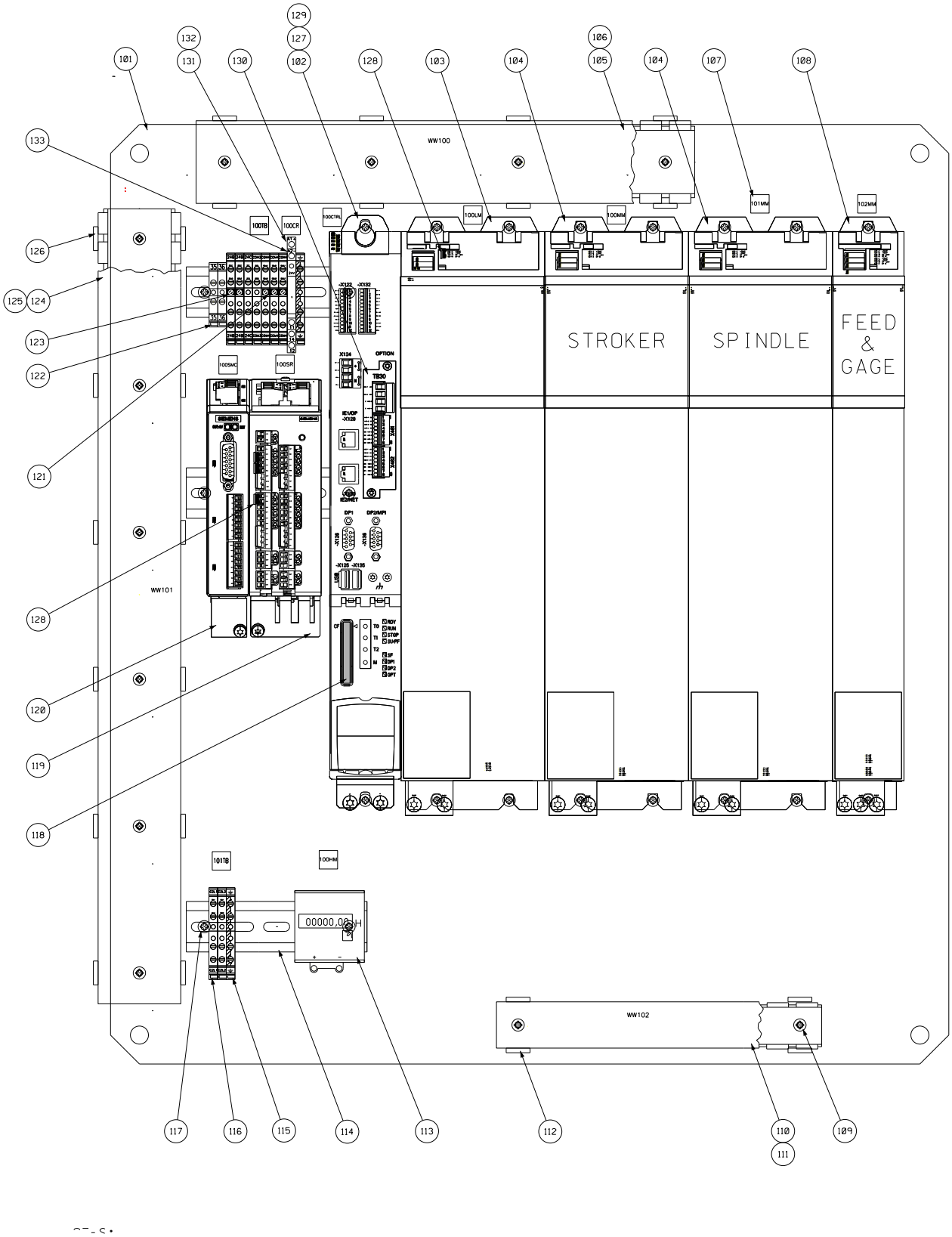

FIGURE 3-A – COLUMN ELECTRICAL PANEL ASSEMBLY

PARTS LIST COVERING FIGURE "3-A"

ITEM NO.	ORDER BY PART NUMBER	QTY.	DESCRIPTION
-	**SV22940**	**-**	**....Column Electrical Enclosure Panel, All** *includes*
101	SV22931	1	.....Electrical Panel
102	PED3169	1	.....Motion Contoller
103	PED3171	1	.....Line Module, 20kW
104	PED3172	2	.....Single Motor Module, 30A
105	WDB0345	1	.....Wiring Duct (2") 345mm
106	WCB0345	1	.....2" Wiring Duct Cover (345mm)
107	PEM154	10	.....Wire & Cable Marking Label; 500 Labels Per Roll
108	PED3173	1	.....Single Motor Module, 3A
108	PED3174	1	.....Double Motor Module, 3A (Post-Process Gage Option ONLY)
109	PHSM440	12	.....Screw (M4 X 0.7 X 12mm PPHTCS)
110	WDA0225	1	.....Wiring Duct (225mm)
111	WCA0225	1	.....Wiring Duct Cover (225mm)
112	PEM496	2	.....Duct Mounting Clip
113	PEM621	1	.....Elapsed Time Meter
114	DRB0125	3	.....Din Rail (125mm)
116	PEM919	9	.....4 Pole 6mm Block
117	PHSM438	22	.....Screw (M5 X 0.8 X 12mm PPHTCS
118	PED3184	1	.....D435 CF With Multi-Axis And 3 Safety Licenses
118	PED3185	1	.....D435 CF w/Multi-Axis & 4 Safety Licenses (Post-Process Gage Option ONLY)
119	PED3178	1	.....Terminal Module, TM54F
120	PED3176	1	.....Sensor Module, SMC30
121	PEM1201	1	.....3 Pole Jumper Bar
122	PEM910	2	.....4 Pole 6mm Ground Block
123	F5035	1	.....Jumper Bar
124	WD3B0550	1	.....2 Inch Wide X 3 Inch Tall Wire Duct (550mm Long)
125	WCB0550	1	.....2" Wiring Duct Cover (550mm)
126	PEM246	10	.....Wire Duct Clip
127	PEC361	1	.....Profibus Connector
128	PEM1309	4	.....Phoenix 2 Terminal; Jumper, 3.81mm
129	PEC421	1	.....8 Position Modular Plug, CAT5E
130	PED3175	1	.....Terminal Board, TB30 (Linear Feed ONLY)
131	PEM1105	1	.....Opto Relay Socket
132	PES769	1	.....Opto Relay
133	PEM1207	1	.....Surge Suppressor

N/S indicates Not Shown

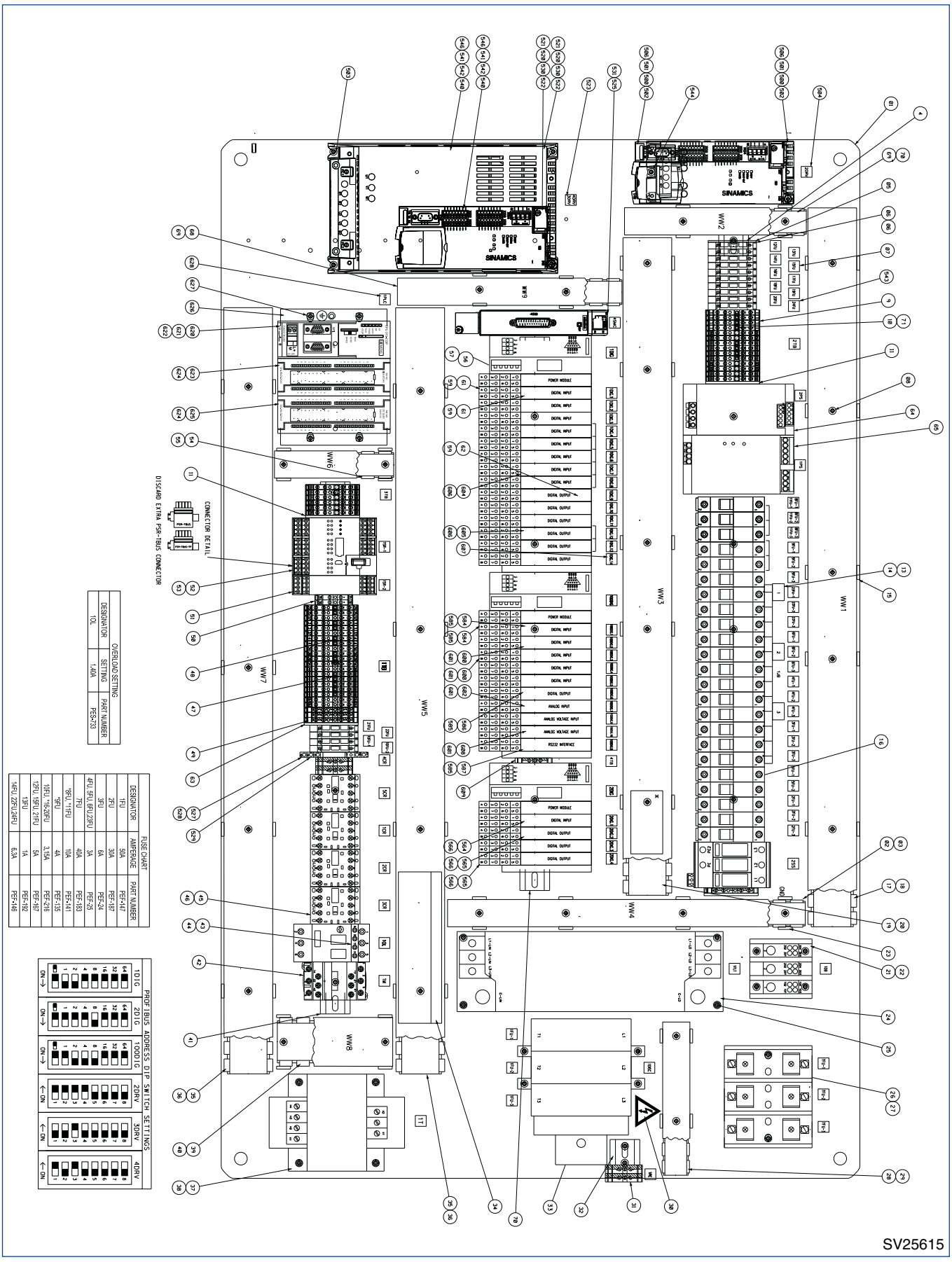

FIGURE 3-B – BASE ELECTRICAL PANEL ASSEMBLY

PARTS LIST COVERING FIGURE "3-B"

ITEM NO.	ORDER BY PART NUMBER	QTY.	DESCRIPTION
-	**SV25615**	-	**....Base Electrical Panel Assembly** *includes*
1	SV55919	1	.....Electrical Subpanel
2	WD3A0420	1	.....1 Inch Wide X 3 Inch Tall Wiring Duct (420mm Long)
3	WCA0420	1	.....1 Inch Wide X 2 Inch High Wire Duct Cover (420mm Long)
4	DRB0775	1	.....Din Rail (775mm)
5	F750	2	.....Small End Fuse GY Cover Section
6	PEM675	14	.....Fuseholder
7	PEM154	67	.....Wire & Cable Marking Label; 500 Labels Per Roll
8	PHSM440	36	.....Screw (M4 X 0.7 X 12mm PPHTCS)
9	PEM919	34	.....4 Pole 6mm Block
10	F5035(4/10)	2	.....Jumper Bar
11	PEM1152	2	.....End Section
12	PEM1356	3	.....Type 2 Surge Protection Plug
13	PEM1194	1	.....Busbar Terminal (Package of 4)
14	PEM931	1	.....Bus Bar
15	PEM246	20	.....Wire Duct Clip
16	PEM755	17	.....Ultrasafe Class CC Fuseholder
17	WD3B0845	1	.....2 Inch Wide X 3 Inch Tall Wire Duct (845mm Long)
18	WCB0845	1	.....2 Inch Wide X 2 Inch High Wire Duct Cover (845mm Long)
19	WD3B0770	1	.....2 Inch Wide X 3 Inch Tall Wire Duct (770mm Long)
20	WCB0770	1	.....2 Inch Wide X 2 Inch High Wire Duct Cover (770mm Long)
21	PEM955	1	.....3 Pole Distribution Block
22	PEM1020	1	.....Distribution Block Cover
23	PEM496	2	.....Duct Mounting Clip
24	PED2135	1	.....RFI/EMI AC Line Filter – 500V, 50A
25	PHSM438	29	.....Screw (M5 X 0.8 X 12mm PPHTCS)
26	PEM1329	1	.....Fuseblock, 600V 60A
27	PEM760	3	.....Protective Fuse Cover
28	WD3A0180	1	.....1 Inch Wide X 3 Inch Tall Wiring Duct (180mm Long)
29	WCA0180	1	.....1 Inch Wide X 2 Inch High Wire Duct Cover (180mm Long)
30	PNP299	1	.....Electrical Decal
31	PET545	4	.....Protective Earth Ground
32	DRB0500	1	.....Din Rail (500mm)
33	PES686	1	.....Disconnect Switch
34	LSV101	1	.....Caution Label - Electrical Panel
35	WD3B0900	2	.....2 Inch Wide X 3 Inch Tall Wire Duct (900mm Long)
36	WCB0900	2	.....2 Inch Wide X 2 Inch High Wire Duct Cover (900mm Long)
37	PEM1102	1	.....Transformer 500 VA
38	PEM1090	1	.....Transformer Cover
39	WD3B0140	1	.....2 Inch Wide X 3 Inch Tall Wire Duct (140mm Long)
40	WCB0140	1	.....2 Inch Wide X 2 Inch High Wire Duct Cover (140mm Long)
41	DRB0625	1	.....Din Rail (625mm)
42	PES710	1	.....9 Amp Contactor 24V Dc Coil
43	PES733	1	.....Manual Motor Starter & Protector
44	PES741	1	.....Auxiliary Contact
45	PES591	4	.....Relay K Line 2NO 2NC
46	PED713	4	.....Diode For DC Contactor Coil
47	F5035(5/10)	1	.....Jumper Bar
48	F5035(2)	7	.....Jumper Bar

N/S indicates Not Shown

Continued on next page

PARTS LIST COVERING FIGURE "3-B"

ITEM NO.	ORDER BY PART NUMBER	QTY.	DESCRIPTION
49	PEM910	4	.....4 Pole 6mm Ground Block
50	PEM709	2	.....Terminal Block
51	PED3189	1	.....Trisafe Digital I/O Expansion
52	PED3188	1	.....Trisafe Modular Safety Controller
53	PED3191	1	.....Trisafe Termination Cover
54	WD3A0140	1	.....1 Inch Wide X 3 Inch Tall Wiring Duct (140mm Long)
55	WCA0140	1	.....1 Inch Wide X 2 Inch High Wire Duct Cover (140mm Long)
56	PED2139	1	.....Remote I/O Bus Coupler
57	PEC361	1	.....Profibus Connector
58	PED2140	1	.....Remote I/O Power Terminal Block
59	PED2141	9	.....Remote I/O Electronic I/O Terminal Block
60	PED3031	1	.....Remote I/O Power Module
61	PED3032	6	.....Remote I/O Digital Input Module
62	PED3033	3	.....Remote I/O Digital Output Module
63	PEM911	1	.....End Section For 4 Pole Ground Block
64	PED2788	1	.....Phoenix Quint 10A 3ph Power Supply
65	PED2838	1	.....Phoenix Quint 20A 3ph Power Supply
66	WD3A0265	1	.....1 Inch Wide X 3 Inch Tall Wiring Duct (265mm Long)
67	WCA0265	1	.....1 Inch Wide X 2 Inch High Wire Duct Cover (265mm Long)
68	DRB0650	2	.....Din Rail (650mm)
69	WD3A0215	1	.....1 Inch Wide X 3 Inch Tall Wiring Duct (215mm Long)
70	WCA0215	1	.....1 Inch Wide X 2 Inch High Wire Duct Cover (215mm Long)
71	PEM1357	1	.....Type 2 Surge Protection Base Element
			COLUMN MOTION (If equipped)
500	PED2794	1	.....Control Unit, Sinamics CU305DP
501	PEC361	1	.....Profibus Connector
502	PED3179	1	.....Power Module A, Sinamics PM340
503	PHSM440	2	.....Screw (M4 X 0.7 X 12mm PPHTC)
504	PEM154	4	.....Wire & Cable Marking Label; 500 Labels Per Roll
505	PEM755	3	.....Ultrasafe Class Cc Fuseholder
506	PED3183	1	.....S110 MMC w/Safety License
			SERVO CRADLE (If equipped)
520	PED2794	1	.....Control Unit, Sinamics CU305DP
521	PEC361	1	.....Profibus Connector
522	PED3133	1	.....Power Module A, Sinamics PM340
523	PEM154	4	.....Wire & Cable Marking Label; 500 Labels Per Roll
524	PHSM440	2	.....Screw (M4 X 0.7 X 12mm PPHTC)
525	PED3183	1	.....S110 MMC w/Safety License
526	PEM755	3	.....Ultrasafe Class Cc Fuseholder
527	PEM1105	1	.....Opto Relay Socket
528	PES769	1	.....Opto Relay
529	PEM1207	1	.....Surge Suppressor
530	PED3183	1	.....S110 Mmc With Safety License
531	CBL1009	1	.....Drive Cliq Cable, 1.2m
			SERVO INDEX TABLE (If equipped)
540	PED2794	1	.....Control Unit, Sinamics CU305DP
541	PEC361	1	.....Profibus Connector
542	PED3186	1	.....Power Module
543	PEM154	4	.....Wire & Cable Marking Label; 500 Labels Per Roll

N/S indicates Not Shown

PARTS LIST COVERING FIGURE "3-B"

ITEM NO.	**ORDER BY PART NUMBER**	QTY.	DESCRIPTION
544	PHSM440	4	.....Screw (M4 X 0.7 X 12mm PPHTC)
545	PEM755	3	.....Ultrasafe Class Cc Fuseholder
546	PED3183	1	.....S110 MMC w/Safety License
			FIXTURE I/O (If equipped)
560	PED2139	1	.....Remote I/O Bus Coupler
561	PEC361	1	.....Profibus Connector
562	PED3031	1	.....Remote I/O Power Module
563	PED2140	1	.....Remote I/O Power Terminal Block
564	PED3032	1	.....Remote I/O Digital Input Module
565	PED3033	3	.....Remote I/O Digital Output Module
566	PED2141	4	.....Remote I/O Electronic I/O Terminal Block
567	PEM154	5	.....Wire & Cable Marking Label; 500 Labels Per Roll
			OPTIONAL COLUMN I/O
600	PED3032	4	.....Remote I/O Digital Input Module
601	PED2141	7	.....Remote I/O Electronic I/O Terminal Block
602	PED3138	1	.....Aanalog Current Input Module
603	PEM154	7	.....Wire & Cable Marking Label; 500 Labels Per Roll
608	PED3200	2	.....Analog Voltage Input Module
609	PET545	1	.....Protective Earth Ground
			OPTIONAL BASE I/O
604	PED3032	2	.....Remote I/O Digital Input Module
605	PED3033	3	.....Remote I/O Digital Output Module
606	PED2141	5	.....Remote I/O Electronic I/O Terminal Block
607	PEM154	5	.....Wire & Cable Marking Label; 500 Labels Per Roll
			OPTIONAL AUTOMATION PLC
620	PED2809	1	.....S7-315-2DP 256K Work Memory
621	PED2792	1	.....Siemens 512K Micro Memory Card
622	PEC361	1	.....Profibus Connector
623	PED2782	1	.....S7 Input Module 32PT
624	PEM1148	2	.....PLC Terminal Block
625	PED2783	1	.....S7 Output Module 32PT
626	PEM1149	1	.....PLC Din Rail
627	PHSM438	4	.....Screw (M5 X 0.8 X 12mm PPHTC)
628	PEM154	1	.....Wire & Cable Marking Label
629	F5035(3/10)	2	.....Jumper Bar
630	PEM919	6	.....4 Pole 6mm Block

N/S indicates Not Shown

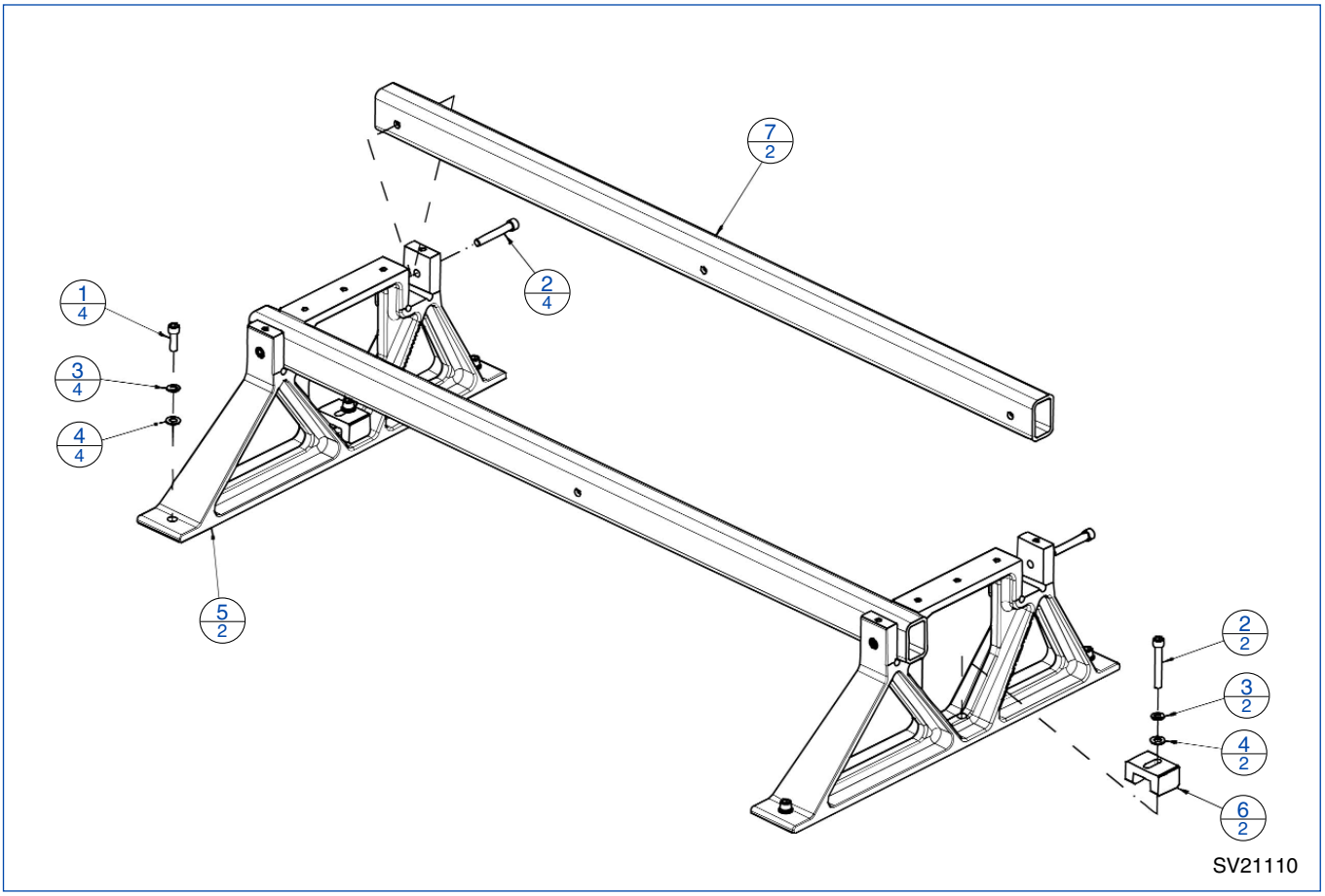

FIGURE 4-A – FIXTURE ASSEMBLY, OPTIONAL

PARTS LIST COVERING FIGURE "4-A"

ITEM NO.	**ORDER BY PART NUMBER**	QTY.	DESCRIPTION
-	**SV21110**	**-**	**....Fixture Frame, Optional** *includes*
1	PHSM452	4	.....Screw, M12 X 1.75 X 35mm SHCS
2	PHSM809	6	.....Screw, M12 X 80mm SHCS
3	PHWM408	6	.....Lockwasher, M12
4	PHWM549	6	.....Flatwasher, M12
5	SV21102	2	.....Fixture Support
6	SV21103	2	.....Fixture Anchor
7	SV26093	2	.....Rail

N/S indicates Not Shown

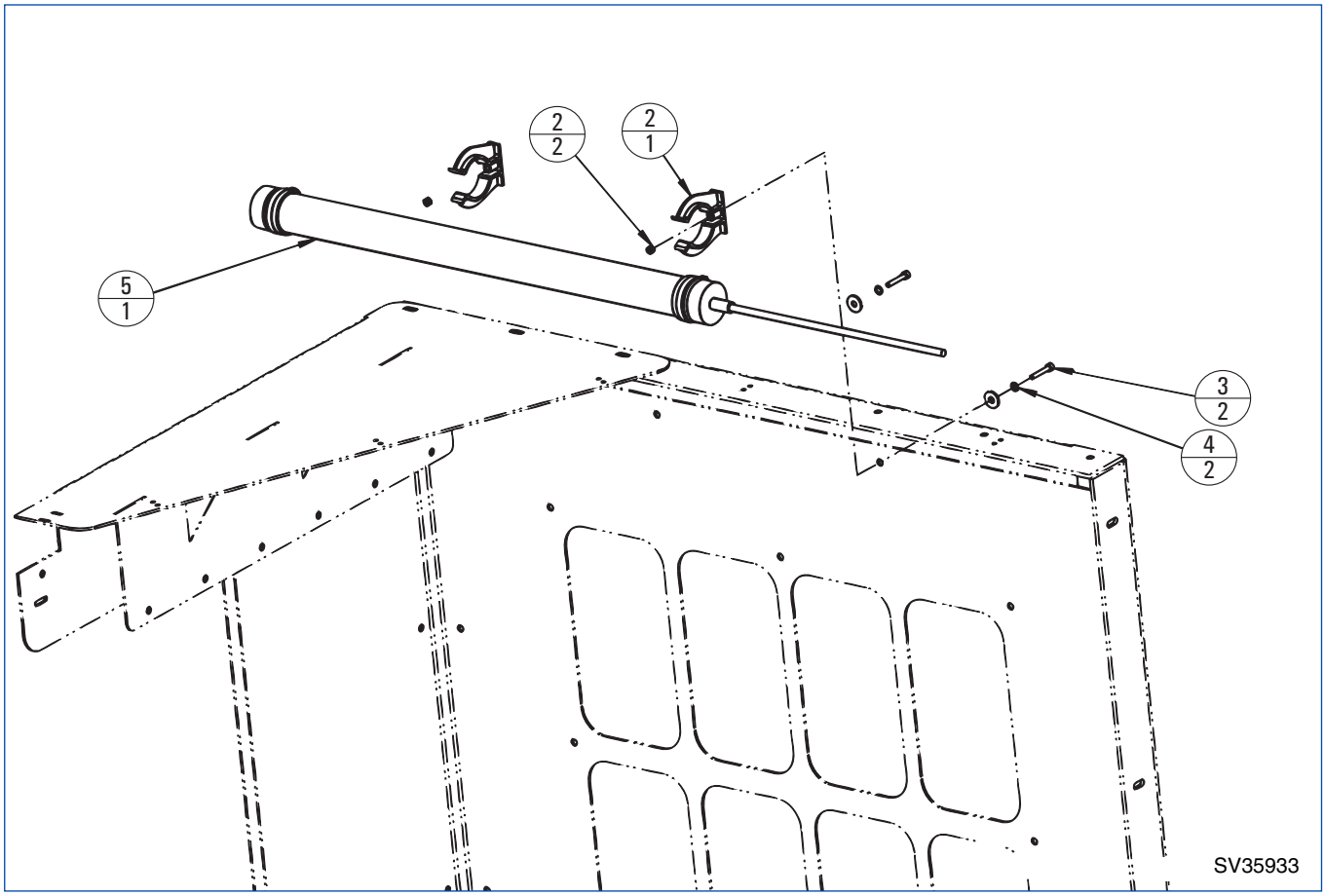

FIGURE 4-B – LIGHT OPTION KIT, OPTIONAL

PARTS LIST COVERING FIGURE "4-B"

ITEM NO.	**ORDER BY PART NUMBER**	QTY.	DESCRIPTION
-	**SV21110**	**-**	**....Fixture Frame, Optional** *includes*
1	PEM1081	2	.....Nylon Grip
2	PHNM441	2	.....Locknut (M5 X 0,8)
3	PHSM507	2	.....Screw (M5 X 0,8 X 30mm SHCS)
4	PHWM570	2	.....Lockwasher (M6)
5	VSS26161	1	.....Florescent Light Assembly *includes*
N/S	PED3027	1	.....Fluorescent Light
N/S	PET747	2	.....Wire Pin 20 To 18 AWG

N/S indicates Not Shown

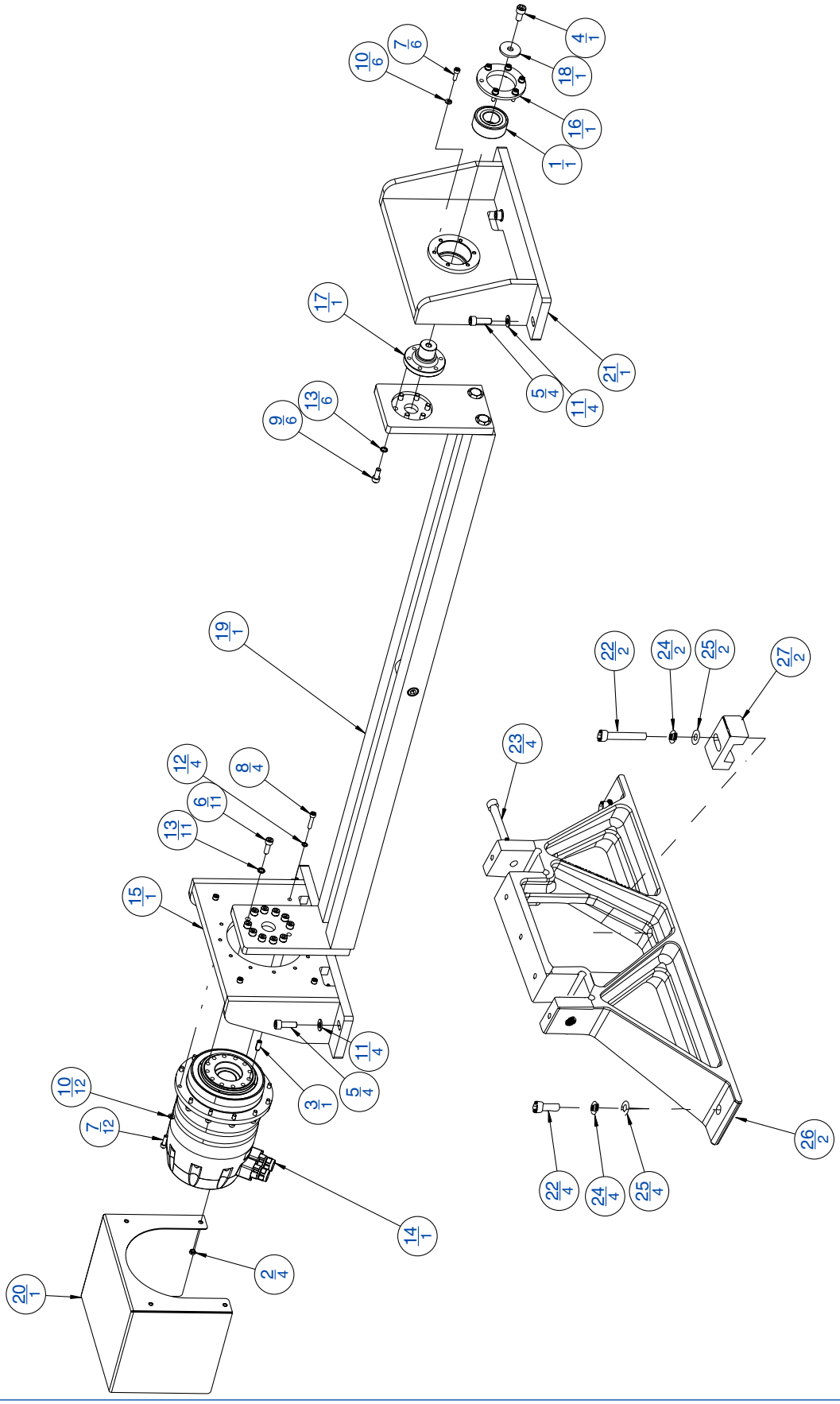

FIGURE 4-C – ROLLOVER CRADLE ASSEMBLY, OPTIONAL

PARTS LIST COVERING FIGURE "4-C"

ITEM NO.	ORDER BY PART NUMBER	QTY.	DESCRIPTION
-	**SV26200**	**-**	**....Rollover Cradle Assembly, Optional** *includes*
1	PBR275	1	.....Bearing
2	PHNM436	4	.....Nut (M6 x 1,0)
3	PHPM571	1	.....Dowel Pin
4	PHSM447	1	.....Screw (M10 x 1,0 x 20mm SHCS)
5	PHSM448	8	.....Screw (M10 x 1,5 x 30mm SHCS)
6	PHSM515	11	.....Screw (M8 x 1,25 x 25mm SHCS)
7	PHSM534	18	.....Screw (M6 x 1,0 x 20mm SHCS)
8	PHSM607	4	.....Screw (M6 x 1,0 x 30mm SHCS)
9	PHSM965	6	.....Screw (M8 x 1,25 x 20mm SHCS)
10	PHWM509	18	.....Lockwasher (M6)
11	PHWM531	8	.....Flatwasher (M10)
12	PHWM570	4	.....Lockwasher (M6)
13	PHWM571	17	.....Flatwasher (M8)
14	PMO1003	1	.....Motor
15	SV26205	1	.....Head Stock Bracket
16	SV26206	1	.....Bearing Retainer
17	SV26207	1	.....Tail Stock Spindle
18	SV26208	1	.....Washer
19	SV26210	1	.....Cradle
20	SV26211	1	.....Cover
21	SV26215	1	.....Tail Stock Bracket
---*	- - -	2	.....Fixture Support Assembly *includes*
22*	PHSM809	6	.....Screw (M12 x 80mm SHCS)
23*	PHWM408	6	.....Lockwasher, M12
24*	PHWM549	6	.....Flatwasher, M12
25*	SV21102	2	.....Fixture Support
26*	SV21103	2	.....Fixture Anchor

N/S indicates Not Shown
*Note: *Indicates items required to mount SV26200, but not part of kit.*

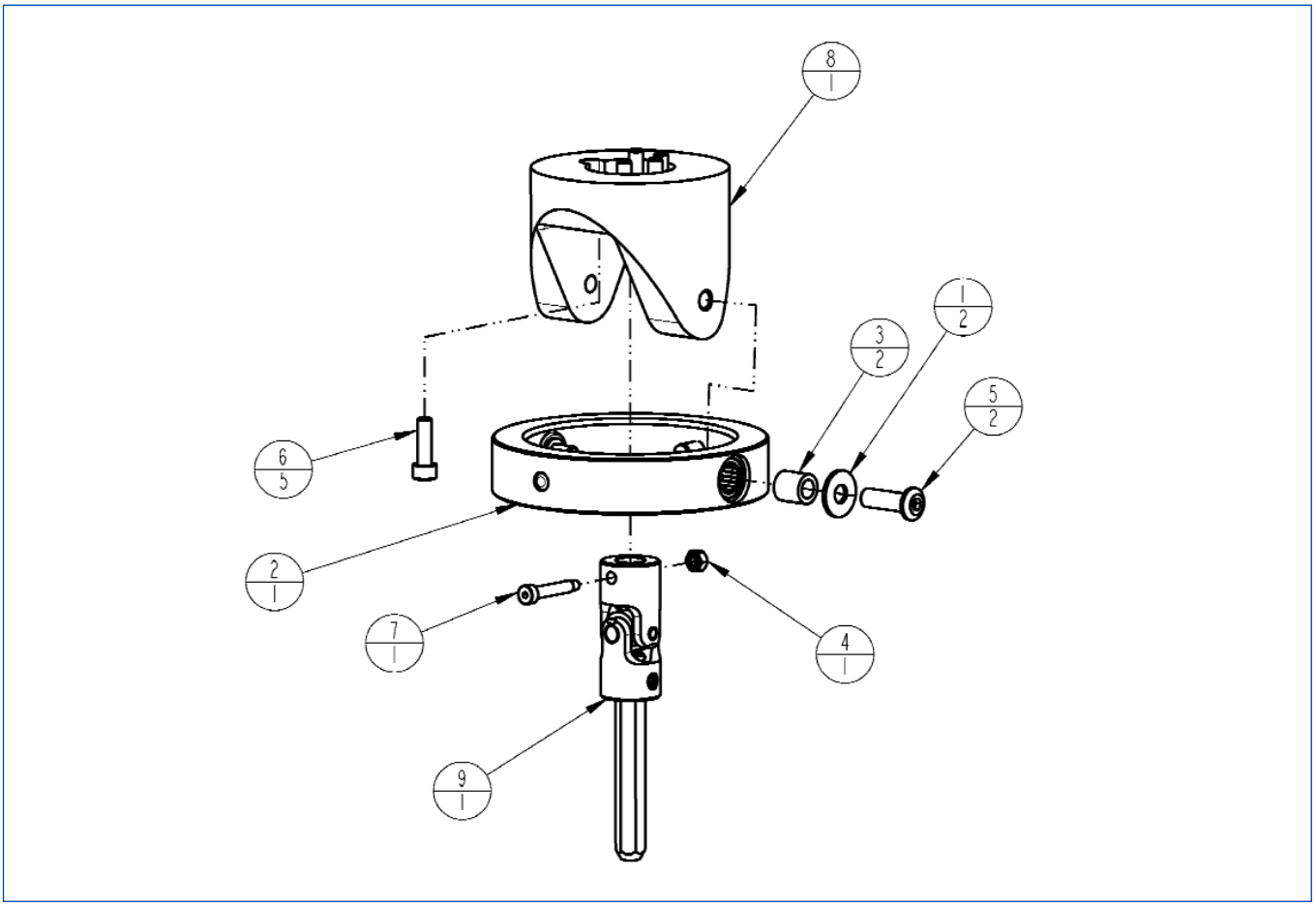

FIGURE 4-D – MPS DRVIE ADAPTER, OPTIONAL

PARTS LIST COVERING FIGURE "4-D"

ITEM NO.	**ORDER BY PART NUMBER**	QTY.	DESCRIPTION
-	**SV23610**	**-**	**....MPS Drive Adapter, Optional** *includes*
1	CK1828	2	.....Flatwasher (.317 Id x .780 Od x .059 Thk)
2	MPS185	1	.....Universal Ring Assembly
3	PBR24	2	.....Inner Race (Bushing)
4	PHNM441	1	.....Locknut (M5 x 0,8)
5	PHS522	2	.....Screw (5/16-24 x 1 BSHCS)
6	PHSM534	5	.....Screw (M6 x 1,0 x 20mm SHCS)
7	PHSM783	1	.....Screw (4mm x 6g x 30mm HSSS)
8	SV23111	1	.....Spindle Drive Yoke
9	SV23600	1	.....U Joint Assembly

N/S indicates Not Shown

WARNING

An Arc Flash Hazard Exists. Follow safe work practices and wear appropriate Personal Protective Equipment. Follow proper lockout/tagout procedures. *Failure to comply can result in death or injury.*

Like any machinery, this equipment may be dangerous if used improperly. Be sure to read and follow instructions for operation of equipment.

MANUFACTURED UNDER ONE OR MORE OF THE FOLLOWING UNITED STATES PATENTS

4.428.160	5.178.643	5.255.476	6.074.282	8.096.853
4.796.363	5.185.969	5.390.448	6.527.620	8.096.859
4.809.440	5.209.615	5.433.656	6.780.084	8.277.280
4.866.855	5.222.625	5.443.417	7.371.149	8.348.718
4.993.189	5.234.295	5.663.886	7.575.502	8.538.575
5.022.196	5.243.792	5.707.278	7.727.051	

OTHER U.S. AND FOREIGN PATENTS PENDING

SUNNEN

SUNNEN PRODUCTS COMPANY. ST. LOUIS. MO U.S.A.

FRACTION / DECIMAL / MILLIMETER EQUIVALENTS CHART

INCH FRACTION	INCH DECIMAL	MILLIMETER	INCH FRACTION	INCH DECIMAL	MILLIMETER	INCH FRACTION	INCH DECIMAL	MILLIMETER
. . . .	.003937	0,1000	9/32	.281250	7,1438	21/32	.656250	16,6688
. . . .	.007874	0,2000	19/64	.296875	7,5406	. . . .	.669291	17,0000
. . . .	.011811	0,3000	5/16	.312500	7,9375	43/64	.671875	17,0656
1/64	.015625	0,3969	. . . .	.314961	8,0000	11/16	.687500	17,4625
. . . .	.015748	0,4000	21/64	.328125	8,3344	45/64	.703125	17,8594
. . . .	.019685	0,5000	11/32	.343750	8,7313	. . . .	.708661	18,0000
. . . .	.023622	0,6000	. . . .	.354331	9,0000	23/32	.718750	18,2563
. . . .	.027559	0,7000	23/64	.359375	9,1281	47/64	.734375	18,6531
1/32	.031250	0,7938	3/8	.375000	9,5250	. . . .	.748031	19,0000
. . . .	.031496	0,8000	25/64	.390625	9,9219	3/4	.750000	19,0500
. . . .	.035433	0,9000	. . . .	.393701	10,0000	49/64	.765625	19,4469
. . . .	.039370	1,0000	13/32	.406250	10,3188	25/32	.781250	19,8438
3/64	.046875	1,1906	27/64	.421875	10,7156	. . . .	.787402	20,0000
1/16	.062500	1,5875	. . . .	.433071	11,0000	51/64	.796875	20,2406
5/64	.078125	1,9844	7/16	.437500	11,1125	13/16	.812500	20,6375
. . . .	.078740	2,0000	29/64	.453125	11,5094	. . . .	.826772	21,0000
3/32	.093750	2,3813	15/32	.468750	11,9063	53/64	.828125	21,0344
7/64	.109375	2,7781	. . . .	.472441	12,0000	27/32	.843750	21,4313
. . . .	.118110	3,0000	31/64	.484375	12,3031	55/64	.859375	21,8281
1/8	.125000	3,1750	1/2	.500000	12,7000	. . . .	.866142	22,0000
9/64	.140625	3,5719	. . . .	.511811	13,0000	7/8	.875000	22,2250
5/32	.156250	3,9688	33/64	.515625	13,0969	57/64	.890625	22,6219
. . . .	.157480	4,0000	17/32	.531250	13,4938	. . . .	.905512	23,0000
11/64	.171875	4,3656	35/64	.546875	13,8906	29/32	.906250	23,0188
3/16	.187500	4,7625	. . . .	.551181	14,0000	59/64	.921875	23,4156
. . . .	.196850	5,0000	9/16	.562500	14,2875	15/16	.937500	23,8125
13/64	.203125	5,1594	37/64	.578125	14,6844	. . . .	.944882	24,0000
7/32	.218750	5,5563	. . . .	.590551	15,0000	61/64	.953125	24,2094
15/64	.234375	5,9531	19/32	.593750	15,0813	31/32	.968750	24,6063
. . . .	.236220	6,0000	39/64	.609375	15,4781	. . . .	.984252	25,0000
1/4	.250000	6,3500	5/8	.625000	15,8750	63/64	.984375	25,0031
17/64	.265625	6,7469	. . . .	.629921	16,0000	1	1.000000	25,4000
. . . .	.275591	7,0000	41/64	.640625	16,2719	1-1/16	1.062500	26,9880

FORMULAS:

MULTIPLY		BY		TO GET
INCHES (in)	x	25.4	=	MILLIMETERS (mm)
FEET (ft)	x	0.3048	=	METERS (m)

MULTIPLY		BY		TO GET
MILLIMETERS (mm)	x	0.03937	=	INCHES (in)
METERS (m)	x	3.281	=	FEET (ft)

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SUNNEN PRODUCTS COMPANY
7910 Manchester Road, St. Louis, MO 63143 U.S.A.
Phone: 1 314 781 2100 Fax: 1 314 781 2268
U.S.A. Toll-Free Sales and Service:**1 800 325 3670**
International Division Fax: 314 781 6128

http://www.sunnen.com
e-mail: sunnen@sunnen.com

BRAZIL – SUNNEN DO BRASIL LTDA
Phone: +55 11 4177 3824 Fax: +55 11 4362 3083
www.sunnen.com.br e-mail: Sbrasil@sunnen.be

BELGIUM – SUNNEN BENELUX BVBA
Phone: +32 3 880 28 00 Fax: +32 3 844 39 01
www.sunnen.be e-mail: info@sunnen.be

CHINA – SHANGHAI SUNNEN MECHANICAL CO., LTD.
Phone: 86 21 5813 3990 Fax: 86 21 5813 2299
www.sunnensh.com e-mail: shsunnen@sunnensh.com

CZECH REPUBLIC – SUNNEN S.R.O.
Phone: +420 383 376 317 Fax: +420 383 376 316
www.sunnen.cz e-mail: sunnen@sunnen.cz

FRANCE – SUNNEN SAS
Phone: +33 (0)1 69 30 00 00 Fax: +33 (0)1 69 30 11 11
www.sunnen.fr e-mail: info@sunnen.fr

ITALY - SUNNEN ITALIA S.R.L.
Phone: 39 02 383 417 1 Fax: 39 02 383 417 50
www.sunnenitalia.com e-mail: sunnen@sunnenitalia.com

POLAND – SUNNEN POLSKA SP. Z O.O.
Phone: +48 22 814 34 29 Fax: +48 22 814 34 28
www.sunnen.pl e-mail: sunnen@sunnen.pl

RUSSIA – SUNNEN RUS
Phone: +7 495 258 43 43 Fax: +7 495 258 91 75
www.sunnen.ru e-mail: sunnen@sunnen-russia.ru

SWITZERLAND – SUNNEN AG
Phone: ++ 41 71 649 33 33 Fax: ++ 41 71 649 34 34
www.sunnen.ch e-mail: info@sunnen.ch

UK – SUNNEN PRODUCTS LTD.
Phone: ++ 44 1442 39 39 39 Fax: ++ 44 1442 39 12 12
www.sunnen.co.uk e-mail: hemel@sunnen.co.uk

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